

The Iron Age

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The Wheeler Surface Condenser.

Comparatively little improvement has been effected in connection with surface condensers since they were first brought into use, and many objectionable features can still be found, such as unequal expansion and contraction of tubes, rupture of tube-heads, leaking and giving out of packing and joints, "crawling" of tubes partially out of their heads, and others. Difficulties also are experienced from unequal distribution of steam over the cooling surfaces, so that parts of the condenser are hot while other parts are cold, insufficient vacuum and liability of the circulating water to leak into the steam space and mix with the feed-water, thus defeating the very objects for which surface condensers are intended.

The Wheeler Surface Condenser, which the Lighthall Mfg. Co., of 97 Liberty street, New York, are introducing, is the result of years of practical experience and experiments. It is claimed to have none of the above objections and to possess the necessary qualifications combined with sound practical features. The tubes are so arranged that they are free to expand and contract without the use of packings of paper, wood or similar materials; in fact, no ferrules, followers, washers or packings of any kind are employed. Plain screw-joints only are used. The tubes are straight, of seamless brass tubing, and carefully tinned inside and outside. They can be easily and thoroughly cleaned, as their form and the means of fastening them readily permit this. The tube-heads, moreover, do not have to be removed from the main part of condenser for the cleaning or repairing of tubes. The pressure (and likewise the temperature) of the exhaust steam as it enters the condenser is reduced to a minimum, and is then uniformly distributed over the cooling surfaces. This, together with a perfect circulation of water in the tubes, produces a more uniform temperature in the condenser, making one portion as efficient as another, and economizing the amount of circulating water and cooling surface. The water of condensation, it is claimed, passes from condenser at the hottest temperature possible. The circulation is very active and thorough, and, consequently, a comparatively small amount of circulating water is required. This feature gives a marked saving in the capacity and power necessary to work the pump.

A section of the condenser is shown in the accompanying engraving. The exhaust steam from the engine, entering the condenser through the nozzle A, comes first in contact with the perforated scattering plate O which protects the central portion of the upper tubes from the deteriorating effect of the direct impingement of the steam. The steam, expanding in the spacious top of the condenser, reduces its pressure and temperature before it comes in contact with the cold tubes. The steam, as soon as condensed, passes to the bottom and flows through the nozzle B to the air pump. It will also be noticed that there is ample room in the bottom of the condenser for the water of condensation, so that it cannot come in contact with the cold tubes; the hot water therefore passes out at the highest possible temperature—according to the vacuum. In that case the water of condensation will be chilled by contact with the tubes, and consequently give cold feed for the boilers. The circulation of the condensing water is as follows. It is pumped into the compartment F through the nozzle C, and enters the smaller tubes of the lower section, as shown by the arrows. After traversing the smaller tubes the water returns through the spaces between the small and large tubes, and empties into the compartment G; thence it passes into compartment H by the passageway E. The water then passes through the tubes of the upper section (in the same manner as just described) into the compartment I, and finally passes out of the condenser by the discharge nozzle D.

The upper part of the engraving shows one of the small and large tubes in section. The small tube M is expanded into the screw-head N, which latter screws into the head K. This small tube ends within a few inches of the cap G of the large tube L, thereby giving ample space for the water to reverse its direction before flowing back through the annular space between the two tubes. The end of the large tube that screws into the head J is drawn thick, so that coarse, deep threads and a slot can be cut; this latter is similar to the slot shown in N, which admits a screw-driver tool for screwing up or unscrewing tubes from the tube-heads. When it is necessary to remove the tubes for cleaning or repairs, both small and large tubes can be drawn out from the same end of the condenser. After removing the small tube the large tube is unscrewed and drawn through the hole left by the removal of the screw-head of the small tube, this hole being a little larger than the thick end of the large tube. As an evidence of the great efficiency of the Wheeler condenser we find it stated that carefully conducted tests have shown the maxi-

mum amount of steam capable of being condensed per square foot of surface to be nearly 200 pounds per hour. This excellent result is ascribed to the effective circulation of the condensing water in the tubes, making them more efficient as cooling surfaces than is usually the case.

Some manufacturing and other establishments frequently suffer from the annoyances of scale and deposit in their boilers, occasioned by the use of muddy river water. By the use of a good surface condenser this trouble, to say nothing of the expense and danger to the boilers, can be avoided, and at the same time a saving of fuel effected. There are also many places where impure or objectionable water not suitable for feed purposes abounds, and which could be utilized with great effect for condensing purposes. In all such cases surface condensers may prove of the greatest advantage.

Oxygen in Metals and Alloys.*

BY PROF. A. LEDEBUR.

It is generally known that several metals, when melted, absorb more or less oxygen from the air, or from the gases produced by combustion, with which they are placed in contact. About the fact itself there can be no doubt, so far as silver, copper and iron, with a very small proportion of carbon in it, are concerned. The question arises, What is the condition of the oxygen that enters into

The great excess of free metal prevents a more higher oxide from being formed, since the metal itself would act as a reducing agency to bring that combination back to the first degree of possible oxidation.

In the case of copper, as well as in that of iron and nickel, no other oxides can be supposed to be formed but protoxides. On this very ground I have never been able to understand why so many metallurgists have admitted on principle that sesquioxide of iron is dissolved in molten iron. Oxygen thus fixed by a metal produces a notable change in its leading properties. If oxygen that is simply dissolved be set free as the metal solidifies it becomes impossible, in consequence of the sputtering, to obtain a metal that is perfectly homogeneous, dense and free from honeycombs. The more rapidly and instantaneously the gas is set free, the more perceptible are these inconveniences. In this respect the oxygen dissolved in silver produces a much more injurious effect than hydrogen dissolved in other metals—than, for instance, in steel, whence it always escapes rather slowly. If a metal that dissolves oxygen be alloyed with another metal in which oxygen can be fixed in the state of the stable chemical combination, the escape of gas and the consequent sputtering must be suppressed, or at least reduced, when the metal becomes solid. This is really done when copper is alloyed with silver; the phenomenon shows itself more forcibly still, if, instead of copper, zinc be used, which is more readily oxidized. However, the sputtering of silver is not always

combination existing in a metallic bath. Take, for example, cast iron, the carbon of which, in combining with the oxygen of oxide of iron, forms carbonic oxide which is readily set free. Something similar happens in the case of nickel being cast. In melting black copper the oxide of copper reacts upon the sulphuret of copper so as to cause SO₂ to be set free, and so on. It stands to reason that very small proportions of gas can produce a very considerable influence, owing to their immense expansion at the temperature to which they are subjected.

My own experience goes to show that these reactions are not necessarily short-lived. They spread over a period of more or less duration, which depends on the degree of affinity between the oxygen on the one hand and the metalloid and metal on the other, as well as on the relative proportions of these substances within the bath. The greater the difference in the affinities the quicker the reaction; the less abundant the active compounds are in proportion to the mass of the bath the longer the reaction must necessarily last. In other words, the exchanges in the metallic baths follow the same laws as the double decompositions in aqueous liquids. The precipitates that may form in this last case are formed within a lapse of time varying with the dilution of the reagents, and when the double decomposition shows itself by change of color the actual process does not show all at once. If a drop of very dilute chloride of iron be added to a solution of ferro-cyanide of potassium, 30 seconds or more may elapse before

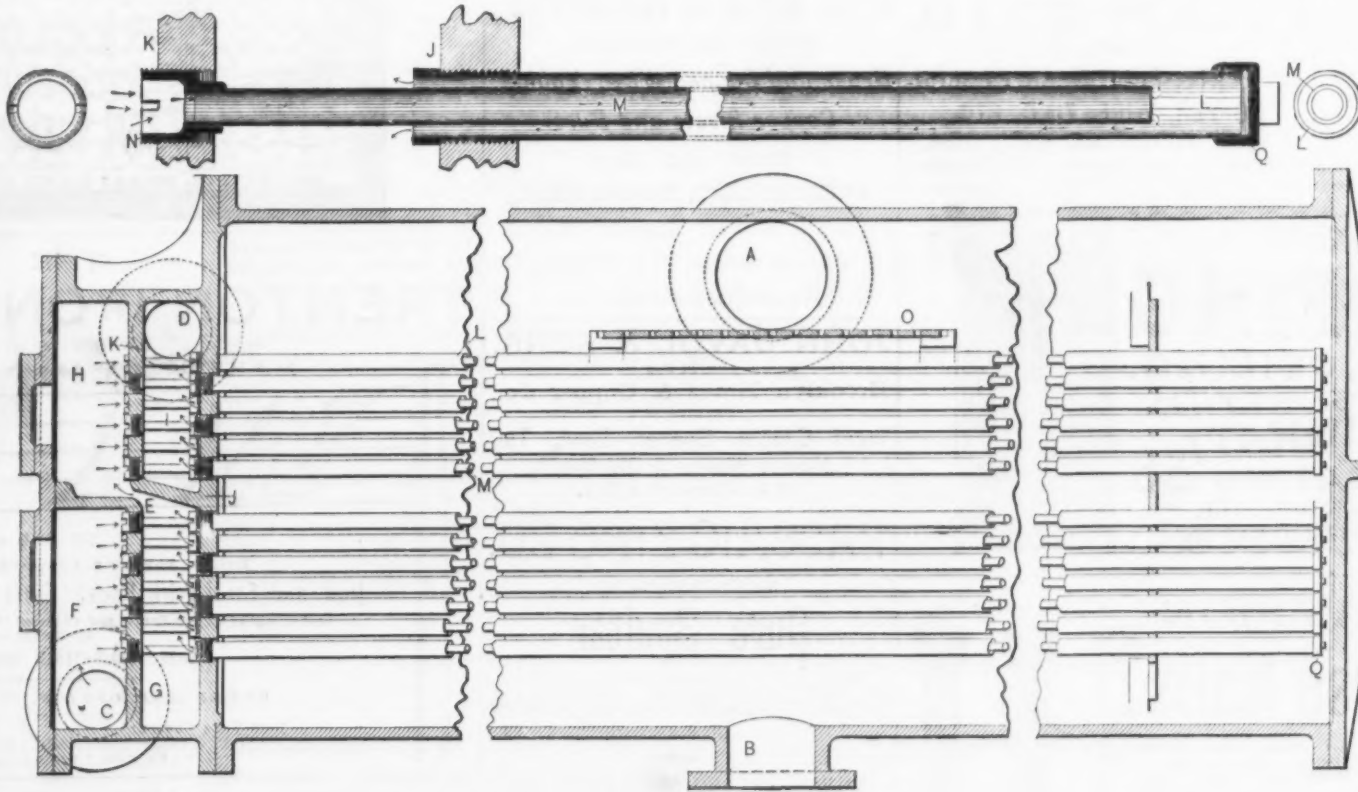
amples. In all these operations the desired object can only be achieved by using an excess of the reagent, and in this, as in the preceding cases, the whole of the oxide in existence can be decomposed only after the contact has lasted a very long time at the melting point. Just as there will always be small quantities of oxide remaining in highly-carburized iron, and small quantities of sulphur in copper containing oxide, so there will also be traces of oxide of iron found in iron containing manganese, and traces of oxide of copper in phosphorated copper or bronze. In some descriptions of steel containing from 0.14 to 0.37 per cent. of manganese and from 0.12 to 0.32 per cent. of carbon I have found as much as 0.012 to 0.03 per cent. of oxygen combined with iron. Examples of phosphorus or manganese bronze still containing oxygen will be given in the sequel.

Since it was first found that small quantities of oxygen are often retained in solid metal, great efforts have been made to find the exact proportion of this oxygen. Although many experiments have been made on the subject, the number of analyses to which credence can be attached is too limited for this metallurgical problem to be looked upon as solved. We cannot shut our eyes to the fact that, owing to the difficulty of finding the exact proportion of oxygen in the presence of the great excess of free metal, and in default of methods of analyzing suited to a number of single metals or alloys, it is as yet impossible for us to accurately ascertain such proportion of oxygen in more than a very few simple metals or alloys. In the case of harder metals that are subjected to a filing or drilling process, the first obstacle in the way of an accurate analysis is the fact that all the tools without any exception have a layer of grease on them. When filings or shavings are heated in a test tube they always emit a more or less pungent smell of burned grease. The only means of getting rid of this grease is to hold the file or bit in a fire first, but by so doing a slight layer of oxide is produced on the surface of the tool, which oxide mixes itself up more or less with the filings or shavings. As far as the analysis itself is concerned, one out of two methods may be chosen. The metal experimented on may be brought up to red heat in a current of pure, dry hydrogen, for the purpose of collecting and weighing the water contained in the metal. This is the first method.

The second method rests on the tendency possessed by certain solvents to attack and dissolve the free metal, leaving its oxygenated combination insoluble. When the metal under operation and all the substances accompanying it are reducible by hydrogen, and the proportion of all the oxygen existing therein in any one form is to be ascertained, this second method is obviously the best. However, as Hampe has shown, the results of this method are not conclusive as regards the repartition of the oxygen among the different substances dealt with. As a matter of course it cannot be applied in the case of metals that are not reducible by hydrogen; nay, if one of these metals is mixed with but a small proportion of reducible metal, there is still a likelihood of the return being inaccurate, for the irreducible oxide may resist the hydrogen, or, as stated heretofore, be but partly reduced, against its will, as it were. Thus, for example, the aggregate quantity of oxygen contained in iron can only be determined by calcination if there be neither manganese nor silicon therein; otherwise there is good reason for apprehending that part of the oxygen remains hidden in the shape of oxide of manganese or silica. The fact that the addition to molten steel neutralizes the injurious effect of sulphur (which it is well known is similar to that of oxygen) in the same way, without removing the sulphur from the bath (as proven by analysis), makes it appear likely that this action is based rather on the formation of a compound between oxygen and manganese than upon any real elimination, although the reduction of the manganese contents, always observed, points to an elimination.

(To be continued.)

C. L. Strobel, of Pittsburgh, Pa., has patented a process of manufacturing eye-bars having enlarged ends and a smaller shank or body between such ends. Heretofore the ends of the bar were heated and worked while the body was cold, which would produce a weakening of the neck, especially in steel. The entire bar had therefore to be restored to its normal condition by annealing the same. To overcome these difficulties the inventor forges on a billet or slab enlargements of approximately the finished shape of head, and then reheats the blank so formed and rolls it to the required length and form without subsequent reheating. Thus the metal of the bar is brought to its final shape while the entire bar is in a uniformly heated condition, and consequently the formation of any injurious strain is avoided.



THE WHEELER SURFACE CONDENSER, BUILT BY THE LIGHTHALL MFG. CO., NEW YORK.

the molten metal? On this point an idea that has every probability in its favor can be formed by taking the chemical properties of each of the aforementioned metals into account. If we have a metal to deal with the affinity of which to oxygen is but slight, and becomes still less when the temperature rises, so that the oxides of such metal become dissociated before the melting point be reached, it cannot be admitted that the absorbed oxygen is kept in a state of true chemical combination. The oxygen is simply dissolved by the molten metal, in the same way in which carbonic acid is dissolved in water, and it escapes again in a gaseous state when the conditions that are favorable to its dissolution become modified—for instance, when the liquid metal becomes solid.

This phenomenon is especially noticeable in the case of silver. Several authors have stated that molten silver dissolves other gases—e. g., hydrogen—in the same way in which it dissolves oxygen. F. C. G. Müller has shown that iron in a liquid state is capable of absorbing large quantities of hydrogen, which again escapes from the metal as it solidifies, and partly even after it has become solid. According to Hampe molten copper dissolves an abundance of sulphurous acid, and, as the copper solidifies, the gas escapes with no less violence than the oxygen, which causes the silver to sputter. A simple dissolution of oxygen, however, cannot be admitted in the case of a metal having such an affinity to oxygen that at a high temperature its oxides are not dissociated. This last property is one common to all except the precious metals; with them I hold that it must needs be admitted that the oxygen is chemically bound up with the metal, and forms with it an oxide which dissolves in the surplus metal. Of the oxygen thus combined none or scarcely any is set free when the metal becomes solid. It seems evident that the oxide formed under such circumstances is the compound containing the least oxygen which the metal produces.

* Chemiker Zeitung.

prevented in this way, and for the simple reason that the action of metal open to oxidation becomes the less perceptible the smaller the quantity of it that has been used, and the greater its affinity to oxygen. A certain quantity of the oxygen that has simply been dissolved can escape from that action, especially if the contact between the metallic bath and the atmosphere, or the gases produced by combustion, admits of an incessant absorption of oxygen up to the time of the melting. In the case of the absorbed oxygen not being set free by the cooling of the metal, and remaining chemically fixed in the state of a protoxide scattered in the mass of metal, the presence of this oxygen seriously affects the mass of the metal. Copper containing protoxide is more brittle and less malleable when cold. Yet the presence of a small proportion of this protoxide is not altogether devoid of advantages; it prevents the absorption of hydrogen, or rather its dissolution in the liquid copper; were such gas set free at the melting point the metal would get blistered. Thus the protoxide pushes, as it were, other substances out of the way, which, like bismuth, would be very injurious in the finished copper. In the case of iron the presence of protoxide tends to make it less brittle, while nickel is rendered less ductile by the presence of protoxide. But this is not all. The metal may contain bodies which at the melting point reduce the oxides and produce volatile compounds of oxygen. As these are set free they produce effects similar to sputtering; the cast metal shows honeycombs which, when brought under the hammer or the rolling mill, may be crushed out of existence, yet, while disappearing, leave certain seams in the manufactured article unless the work be carried on in such a way as to cause the surfaces of the blister to be welded together. This, however, is a very exceptional occurrence, even in the case of metals that have a disposition that way. On the other hand, a volatile compound is not infrequently formed at the expense of the oxygen and of a com-

the blue coloring appears—that is to say, before the double decomposition commences to take place. A similar phenomenon may be observed when a very diluted solution of chloride be added to iodide of potassium and starch. In the same way, if a drop of permanganate of potassium be added to a very diluted liquid of neutral sulphate of manganese, several minutes may elapse before the red coloring of permanganate disappears. It may thus be understood that in iron containing protoxide of iron carbon may remain, and that in a certain copper both sulphuretted and oxide of copper may keep a place, even after these metals have been in a liquid state for some time; but the quantity of one of these active bodies is necessarily reduced in proportion as the other is all the more abundant and as the two compounds may have acted on one another for a longer time. In the aforementioned examples the action of oxide of iron on carburet, and of oxide of copper on sulphuret, takes place without interruption, and shows itself by constant escape of gas; but intensity of the reaction decreases in proportion as the quantity of one of the active compounds grows less.

The combined oxygen may be removed, or at least its injurious influence greatly reduced, by adding to the molten metal substances that have a disposition for taking in oxygen, the oxygenated compounds of which are readily separated from the molten metal, or which, if they remain dissolved therein, produce a less marked influence than the oxide of the metal itself. The setting free of gas arising from the twofold decomposition of oxide with carbon and of oxide with sulphuretted copper cannot take place if the newly-formed oxygenated compound cannot be decomposed by either coal or sulphur. To destroy the oxide of iron in the molten iron, manganese is used; to destroy the protoxide of copper in copper and bronze, phosphorus is used, while the magnesium added to molten nickel plays, according to Fleitmann, a part similar to that of manganese or phosphorus in the preceding ex-

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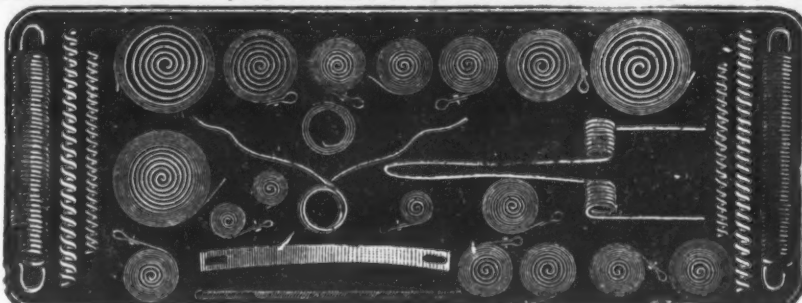
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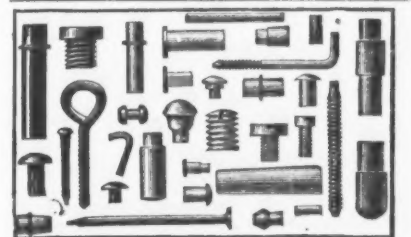
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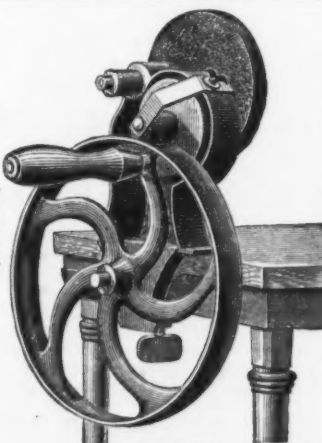
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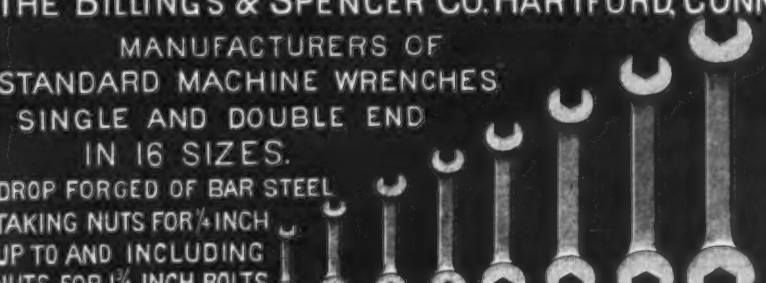


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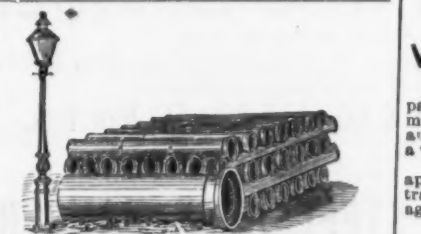
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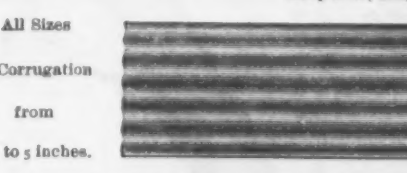
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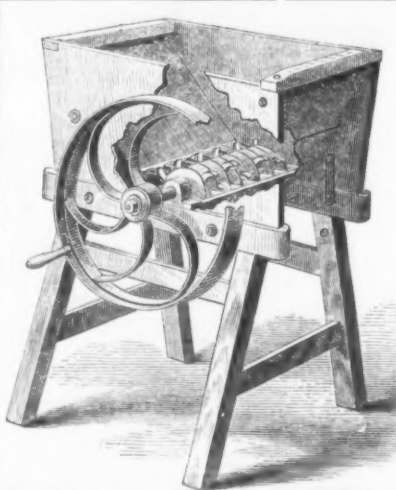
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LYNCHBURG, VA.Foundry and Forge Pig Iron.
STORAGE, WHARF AND YARD, Delaware Avenue,
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LINDSAY, PARVIN & CO.,SUCCESSORS TO LLOYD & LINDSAY,
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DEALERS IN ALL KINDS OF SCRAP IRON.

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Special Wheels for Furnace and Mine Cars.

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Foundry and Forge.

Puddled Bars,

Special for Axles, Best Neutral and Common.

Particular attention given to Iron for Special Purposes.

Plate and Sheet Steel,Every description of Light Plates and
Sheets of Steel.**Plate and Sheet Iron,**Best Bloom, Tube, Cleaned, Best Refined,
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Chains for Foundry Cranes and Slings.

"D. B. G." Special Crane Chain.

Steel and Iron Dredging, Slope and Mining Chains.

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Manufactured from the celebrated OTIS STEEL BRAND

STANDARDQuality and efficiency fully guaranteed. Prices as low
as any of the same quality. We manufacture Heavy and
Light Forgings, Driving and Car Axles, Crank Pins, Piston
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Baltimore. Price lists on application.**JUSTICE COX, JR., & CO.,**Agents for
Chickies, Conewago, Montgomery and Eureka
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FIRE BRICK, COAL and COKE, MUCK BARS, Handle
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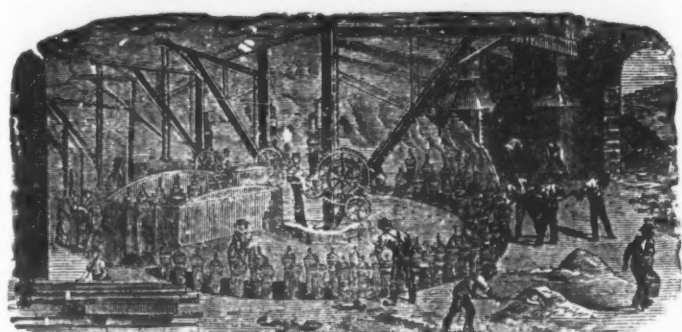
Sheridan, Leesport, Temple, Lynch-
burg, Millcreek and Mt. LaurelFoundry **PIG IRON** and Forge**CHARCOAL PIG IRON.**

Also Woodbridge Clay Mining Co.'s Fire Brick.

**Philadelphia's Manufacturing Indus-
tries in 1885.**Through press of matter we were unable
to print in last week's issue the following
report from our Philadelphia correspondent:At the Baldwin Locomotive Works business
has been exceedingly dull during 1885. Their
capacity is 12 locomotives per week, their
average for two years previous to 1884 hav-
ing been very nearly that, but fell off during
the current year to less than three per
week. During the first eight months they
had very little work and turned out only two
per week, but since the beginning of Septem-
ber they have increased threefold, averag-
ing six per week, with every indication that
for some time to come they will maintain or
increase that number. Mr. Converse reports
favorably on the outlook, but fails to see
anything beyond a return to the normal
condition of affairs, although the change of
gauge on the Southern roads will probably
lead to a considerable demand for new loco-
motives. They are now shipping 10 narrow-
gauge engines to Queensland, but the foreign
demand is not large at present.Hoopes & Townsend, bolts, nuts, &c., re-
port a very fair trade throughout the entire
year, but, as in other departments, prices
have been very low. The demand for goods
has improved considerably since September,
and the outlook is considered favorable for
continued improvement, both as regards
volume of business and prices. The car
shops with whom this firm have very close
relations are showing signs of a return to
activity, and there appears to be good rea-
sons for expecting at least a full average
year's business during 1886.Bradlee & Co., chains, say that the year's
business has been very unsatisfactory on the
whole, owing to the extreme depression in
shipbuilding. Parties in lumber regions
have been good buyers during the past two
or three months, however, and they are in-
clined to think that 1886 will show some-
what of an improvement over its predeces-
sor, although the outlook is still rather in-
definite.Southwark Foundry and Machine Co. re-
port a largely increased business during the
past year, and plenty of work on hand at the
present time. Conversation and correspond-
ence with many customers tend to confirm
expectation of a general good business
early in the new year.William Sellers & Co. speak with some
degree of reserve in regard to the business
position. The demand for their special
tools has been quite limited during the
greater portion of the year, owing to the
general depression in business and the un-
satisfactory position of the transportation
companies generally. There has been more
inquiry of late, however, and the indications
are believed to be favorable for some little
improvement during the coming year.Bement, Miles & Co. say their business is
smaller in volume than it was last year, and
prices obtained materially lower. At pre-
sent their work in large tools and in the
foundry is quite brisk, but in the smaller
work comparatively quiet. They express
no opinion as to future business.With E. Harrington, Son & Co. the year
now closing has been unsatisfactory on the
whole, the first eight months especially so.
Since September there appears to have been
a slight improvement. Hoists and small
machinery have sold more freely, and prices
are a shade better. There is also a better
prospect for the larger tools, and on the
whole this firm expect continued improve-
ment, unless something very unforeseen
occurs.James Moore, rolling-mill machinery, re-
ports business far behind that of last year,
and all at exceedingly meager figures.
He has scarcely any work on hand, and
feels dubious about any improvement so far
as he reads the present situation.Israel Johnson, Jr., & Co. report that busi-
ness has not measured up to last year's, and
prices have been exceedingly low. They have
maintained their standard quality of work,
however, and by doing so have been com-
pelled to refuse considerable business which
could have been secured by lowering the
grade and competing with inferior goods.
Inquiries have been coming in very freely
during the last few weeks, but actual orders
are still scarce. They base any expectation of
new business only on the hope that Congress
will assert its intention not to meddle with
existing tariff laws.Dienelt & Eisenhardt have been excep-
tionally busy during the entire year, chiefly
on special machinery, and have still a large
amount of work of that kind unfinished.
The demand for drop hammers, which is
one of their specialties, is picking up con-
siderably, and promises still greater activity
during the coming year.C. C. Newton is doing a fair amount of
work, having considerable yet on hand for
the Worthington Pump Works, of Brooklyn,
N. Y. Many inquiries are being received,
and on that fact he bases the hope of a better
business shortly, though strong competition
still keeps prices down.L. B. Flanders Machine Works (Pedrick
& Ayer) say they have done much more
work during this year, and at the present
time have a large amount on hand. Affairs
with them lead them to expect and believe
there will be plenty of business during the
coming year.Diebel Mfg. Co. say orders under way
indicate a continuance of the fair business
they have been doing for some months back.
Their specialties in emery grinders are meet-
ing with favor, and they are disposed to
feel very sure of a busy season the coming
year.Goodell & Waters, wood-working ma-
chinery, find that business for most of the
year will not measure up to the same time
last year, but the few months just ending
make a much better showing, leaving them
with considerable work still on hand. Many
inquiries are coming in, and the prospect for
new business is quite bright.L. Power & Co. think they have
done considerably more business this
year than they did last in wood-working ma-
chinery, but at reduced prices. The outlook
is satisfactory because of the amount of

A. H. McNEAL,
BURLINGTON - NEW JERSEY.

FLANGE PIPES.



General Foundry Work.

CAST IRON PIPES
FOR WATER AND GAS.

ESTABLISHED IN 1848.

SINGER, NIMICK & CO., LTD.,
PITTSBURGH, PA.,

MANUFACTURERS OF ALL KINDS OF

HAMMERED AND ROLLED

STEEL,

WARRANTED EQUAL TO ANY PRODUCED.

BEST REFINED TOOL CAST STEEL

For Edge and Turning Tools, Taps, Dies, Drills, Punches, Shear-Knives,
Cold-Chisels and Machinists' Tools generally.

SAW PLATES

For Circular, Mulay, Mill, Gang, Drag, Pit and Cross-Cut Saws.

Sheet Steel

For Springs, Billet Web and Hand Saws, Shovels, Cotton Gin Saws,
Stamping Cold, &c., &c.

SIEMENS-MARTIN (Open-Hearth) PLATE STEEL
For Boilers, Fire-Boxes, Smoke-Stacks, Tanks, &c.

All our Plate and Sheet Steel being rolled by a Patented Improvement, is unequalled for
surface finish and exactness of gauge.

ROUND MACHINERY CAST STEEL

For Shafting, Spindles, Rollers, &c., &c.

File, Fork, Hoe, Rake, R. R. Frog, Toe-Calk, Sleigh-Shoe and Tire Steel, &c.;
Cast and German Spring and Flow Steel.

"Iron Center" Cast Flow Steel. Agricultural Steel cut to any pattern desired. Attached.
"Soft Steel Center" Cast Flow Steel. Steel Forgings made to order.

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HOGAN & SON, General Agents for Eastern and New England States.

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FRANKFORD, PHILA. PA.,

STEEL RAILROAD AND MACHINE FORGINGS,
SOLID CRUCIBLE STEEL CASTINGS

AND
Best Grades of Tool and Machinery Steel.

Light Steel Rails,

40 lbs., 35 lbs., 30 lbs., 25 lbs., 20 lbs. and 16 lbs. per yard.

APPROVED PATTERNS.

For Mine, Lumber and Narrow-Gauge Railroads.

ALSO SPLICE PLATES, SPIKES, SWITCHES, FROGS, &c., &c.

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or 160 Broadway, New York.

TOWER'S CHAMPION SCREW DRIVER.
SOLID BOLSTER AND FLUTED HANDLES.

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EVERY BLADE TESTED AT THE FACTORY.

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Agent for Jersey City Steel Company,
Manufacturers of **STEEL** Of All Descriptions.
WAREHOUSE, 99 and 101 JOHN ST., NEW YORK.

STANDARD STEEL CASTING CO.,
THURLOW, PA.,
Open Hearth and Crucible
STEEL CASTINGS.

QUALITY EQUAL TO STEEL FORGINGS.

Can be Bent, Welded or Forged.

STEEL INGOTS, Best Stock, Furnished to Order.

Ship Patterns direct to Thurlow, Pa., via P. W. & B. R. R., or via P. & R. R. R.

We are prepared to make all kinds of Heavy or Medium Weight

STEEL CASTINGS
FROM
OPEN HEARTH METAL.

We wish to give special attention to making Cast Steel Rolls of all sizes, Mill
Gearing wherever Cast Steel is suitable. Also Cranks, Cross Heads, Shafts,
&c., for Steam and Blowing Engine construction.
Being desirous of securing a share of public patronage, we will endeavor to make our
product equal in quality to any in the market.

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PITTSBURGH, PA.

HICKS & DICKEY,
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IRON AND STEEL.

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CAST TOOL STEEL.

HARTMAN STEEL CO., LTD.,
Tire, Toe, Sleigh, Machinery, Spring Steel, &c.

W. S. SIZER'S FORGINGS, STEEL AND IRON.

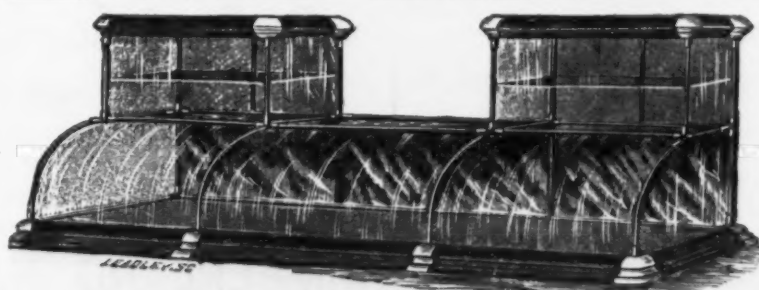
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Sanderson Bros. & Co.'s
Fine Cast Steel

FOR TOOLS, DIES AND ROCK DRILLS.

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PERFORATED SHEET METALS
FOR ALL KINDS OF GRAIN CLEANING MACHINERY in any size and for all uses.
REVOLVING SCREENS of every description made to order. STAMP
BATTERY SCREENS a Specialty.
PERFORATED TIN & BRASS
Of all sizes for FILTERS, STRAINERS, VENTILATORS, &c., &c.
Iron, Steel, Copper, Brass and Zinc Punched to any size and thickness required.
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BOILER TUBES.

Steam, Gas and Water Pipe, Oil

Well Tubing, Casing

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LINE PIPE.

Cotton Presses, Forgings, Rolling

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104 Reade St., New York.

THE PATENT

Cylinder Tumbler

BRASS

LOCK

requires no screws or

nails to fix it on,

easiest applied of any

lock in the market,

and most difficult to

pick.

Sample Lock and

two steel keys nickel-

plated for 50 cts. in

stamps.

Mailed Free with

Trade List.



GOLLNER'S ADJUSTABLE RINK SKATE.
Cheapest and most durable all-metal clamp skates.
Particularly adapted for Rinks. Can be made to any
size by changing the connecting rod. It is made of
a good quality of special steel, heavily nickel-plated.
It has durable rubber cushions, and is provided with
the best boxwood wheels. Sample pair sent to any
address on receipt of price, \$2.50. One dozen pairs,
\$24.00. Address GOLLNER MFG. CO., 223 Centre
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After continual use in several of the leading rinks
in the country, we guarantee that our Rollers are in
any and all respects equal to box-wood rollers—and
we believe superior. We can furnish these Rollers at
from 25 to 35 per cent. less in price than box-wood,
and if you desire any of these Rollers we must have your
orders now to be filled two months later. A sample
set furnished by mail for 50 cts. A superior quality
of Sugar Wood bottoms also furnished at rock-bottom
prices. Address
SPRINGFIELD MFG. CO.,
P. O. Box A. E. SPRINGFIELD, OHIO.

TYRONE IRON CO.,

Works at Tyrone Forges, Blair Co., Penn.,

MANUFACTURERS OF

BEST CHARCOAL BLOOMS

and **BOILER TUBE SKELP.**

ALSO TACK AND NAIL PLATE.

Blooms guaranteed and especially adapted
for stamped ware.

GEO. M. EDDY & CO.,

Manufacturers of

Measuring Tapes

of Cotton, Linen and Steel.

FOR A. L. P. ROPERS.

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SILVER & DEMING MANUFACTURING CO.,

Salem, Ohio, U. S. A.,

MANUFACTURERS OF

CISTERN, PITCHER, WELL and

PUMPS

Wind Mill Pumps, Hand

Pumps, and Power Rotary

Pumps,

HYDRAULIC RAMS,

Boiler Feed Pumps, Gar-

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Also Carriage Makers' Tools,

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Write for Catalogue and Prices.

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PUMPS, HYDRAULIC RAMS, GARDEN ENGINES,

Yard Hydrants, Street Washers, Galvanized Pump Chain, Wind Mill

Pumps and other Hydraulic Machines in the World.

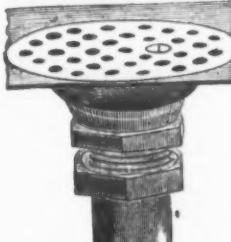
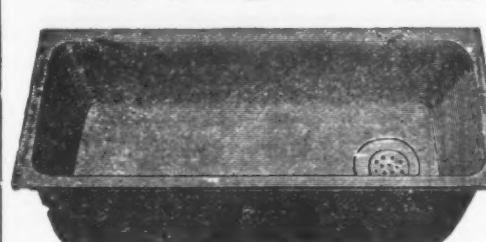
FIG. 180.



FIG. 200.



FIG. 70.

**Wrought Steel Sinks.**

One of the strong points of these sinks is the new coupling with which they are now supplied and which is pronounced by all plumbers the best on the market. It is used with both lead and wrought-iron pipe; is a neat, reliable coupling, and is easily detached for the purpose of pumping out the pipe. The strainer and all parts of the coupling are tinned, and are furnished with all sinks without extra charge.

The fact of the great strength and durability of this sink, as it is practically free from danger of breakage in transportation, handling or use, is a strong point in its favor, and that its merits are recognized by most competent judges is evident from the fact that leading houses which have been interested in the common article have taken up the Wrought Steel Sink. Twenty-five per cent. is saved in freight by purchasing Steel Sinks. Orders come from all parts of the United States, Canada, Europe and Australia.

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UNION MANUFACTURING CO.

Sole Manufacturers of

SKINNER'S PATENT**COMBINATION CHUCK.**

Universal, Independent and Eccentric.

By sliding a stud on the back of Chuck it is in-

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parts are made interchangeable. Only the very best

materials used in their construction. Reverse or

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We also manufacture

Plain and Ornamental Butts.

Single and Double Acting Spring Hinges,

Union Coil Door Springs,

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Patent Rubber Buckets,

Wooden Well Curbs, Wood Tubing,

Iron and Brass Pumps,

Patent Copper Pumps,

Hydraulic Rams, Power Pumps,

&c., &c., &c.

Write us for prices.

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NEW BRITAIN, CONN.

WAREHOUSES: 108 Chambers Street, New York, and 164 Lake Street, Chicago.

GEORGE BROOKE, President.

GEO. W. HARRISON, Treasurer.

work on hand and the apparent necessity for new work as indicated by the receipt of a great many inquiries for prices and other details; they look for a busy spring trade.

George V. Cresson, shafting and pulleys, says he seems to have been particularly fortunate in having been quite busy during the entire year. He has run full force and time, and has at no time laid off any of his hands for want of work. Besides his odd orders, he has quite a large amount of work upon contracts—one with Leedom & Co., carpet manufacturers, for their new mill at Bristol, Pa., and another for the new building of the Puck Publishing Co., of New York. He feels assured of plenty of new business for some time to come.

Thomas Wood, shafting and pulleys, reports his business in this line as having been quite dull during the entire year, and prices barely allowing them to come out whole. He fails to find a single fact upon which to express any expectancy of better times in the near future.

Stokes & Parrish, elevators, &c., say they have turned out fully as much work as during 1884, but low prices have cut down the aggregate amount. Great competition has kept prices away down, and for this reason also they do not expect any material advantage in the near future. They have a great deal of work in hand, and their correspondence leads them to expect plenty for some time to come.

Morse, Williams & Co., manufacturers of hoisting machinery, &c., report favorably of the outlook, although the year's business has been somewhat of a disappointment on the whole. Competition has been unusually keen, and the tendency to cheapen cost at the expense of quality has kept them out of a great deal of work. They have done a large business, nevertheless, and at this time have orders on their books from North Carolina, Georgia, Tennessee, Massachusetts, Maine, Canada and other distant points, besides a large amount from New York, Pennsylvania and adjoining States. They purchased and since midsummer have occupied the very extensive premises formerly owned by Martin Landenberger & Co. They also bought from E. W. Bliss, of Brooklyn, the drawings and patterns of the Waldron rotary engines, which they are building and expect to sell largely in connection with their hoisting machinery, as they are specially adapted for work of that kind.

R. B. Siedel, manufacturer of blacklead crucibles, says business has been very good during the entire year, and that the amount is largely in excess of 1884. Orders are coming in very freely. Much business is being offered which he cannot accept because of a disposition to force prices down. His aim is to make the best quality of work, and contend for prices that will warrant it. Two contracts (for 40,000 crucibles in one case, and 12,000 in another) have been declined during the last week because he could not meet price offered and keep up his standard of quality. Prospects for good business are bright, and he is about to put in more machinery and otherwise enlarge his facilities.

Main Belting Co. have done about a fair average business, but, as in other cases, low prices have prevailed throughout the entire year. They consider the outlook more encouraging than it has been for some time, and are running up to their full capacity, with a good many inquiries from new sources. This company make the largest belts in the world, one in warehouse at the present time being 90 inches in width. In addition to the home trade, they are gradually working into foreign countries, strength, durability and cost of their belts enabling them to meet competition from any source.

Alexander Bros., leather belting, say a comparison of this with last year's business shows about the same volume, but covers a larger number of customers, and accomplished only by greater efforts than ever before. The limited consumption and low prices made these efforts necessary to prevent running behind. Considering the feeling exhibited by their general trade, they are constrained to believe there is a good prospect for a better trade during the coming year.

Schleicher, Schumm & Co., manufacturers of gas engines, report their sales as comparing favorably with the number of engines sold during 1884. While their business is somewhat quiet at the present time, they think the indications are in favor of a more active demand for their productions in the early part of the coming year, and entertain a very hopeful feeling with regard to the future.

Greenwood Horseshoe Co., manufacturers of horseshoes, speak hopefully of their increasing business, which has been quite satisfactory during the few months they have been established, and they believe there is every reason to expect a large demand during the coming year.

Harrison Boiler Works report favorably in regard to the year's business, but expect still better things during 1886. They will hereafter be represented in the South by Mr. Chas. H. Wilcox, with an office in Atlanta, Ga.

Henry Diston & Sons report a fair average business for the entire year, but at extremely low prices. The later months have shown some improvement, while the outlook, particularly for saws, is thought to be excellent. The file trade they think, does not look quite so promising, as the heavy stocks laid in previous to the advance in prices have not yet been marketed. With saws they think it is different, stocks being unusually low, while prices are still at about the lowest figure. They will commence the new year running full in all their departments, and expect to maintain that position straight along.

J. Barton Smith Co. say their business during 1885 has been more than double that of last year, though prices obtained have been an average of 33 1/2 per cent. lower. Their factory has been taxed to the utmost to fill orders, and during the past year their production has averaged 500 dozen per day. At present they are turning out 800 dozen per day. This remarkable increase in business is accounted for by reason of the

patent file and handle meeting with much favor in the trade and among consumers. Orders are in hand sufficient to run their factory until April 1, and from inquiries and other causes they expect a large business during the coming year.

G. & H. Barnett feel very well satisfied with the "sizing up" of this year's business, which somewhat runs ahead of last year. Like the majority of manufacturers, they have been compelled to work in the face of extremely low prices and fierce competition, and consequently feel tolerably well satisfied with the amount of business done. Their December orders, even at the increased prices which went into effect on the 1st inst., are far ahead of what they expected, and general business is in such a condition as to lead them to think that brighter things are coming to stay.

McCaffrey & Bro. feel satisfied with the amount of business, which is fully up to the volume of last year. This has been done without going to the extreme in reducing prices, which has prevailed in many quarters. They have maintained the quality of goods, and as far as possible their price at what they deemed fair and reasonable rates. Their present business is satisfactory, and they have every reason to expect a steady increase in the approaching year.

With Alfred C. Rex & Co. business during 1885 has been about equal in volume to that of last year, but at lower prices. Prospects are favorable, however, and inquiries and orders are coming in great numbers. In the uncertainty as to the price of material they are unwilling to make prices for very far in the future, and because of this have been compelled to refuse two or three large contracts, notably one for 500,000 of their steel-edge hatchets, offered them at a price to be guaranteed for six months.

Thos. Devlin & Co. report the business of the year to be fairly satisfactory as to the amount done, which will probably reach that of last year; prices have never been at such low figures, however, while wages as a rule have been running within 10 per cent. of the highest ever paid even during the war times. Orders are in hand in such quantities as to make them feel more confident that business is slowly but surely improving. Slight advances in price are being made, and are usually accepted to without much opposition.

North Bros., hardware manufacturers and castings, report a slight increase in the volume of business of 1885 as compared with that of 1884, the most of it, however, being done during the last few months. Considerable new business could be had if it were possible to guarantee prices for the future, but this cannot be done because of the uncertain relations with the molders, who are demanding very high wages. Were it not for this the outlook would be more cheering.

J. W. Paxson & Co., foundry facing, &c., state that business has been far from profitable during the year now closing, but it has been the policy of this firm to maintain their trade, so that they have had to meet unusually close competition. They have run full during the entire year, which, with their very extensive facilities, has necessitated the disposal of an immense amount of goods. Messrs. Paxson & Co. regard the coming year as likely to be one of improvement, but as yet prices respond slowly. They are also manufacturing the steel wire tube and flue brush (Farley's patent), the merits of which are too well known to require explanation.

J. A. Emerick & Co., foundry facings, report business as equal in volume to previous years, but, in common with others, complain that prices are very unremunerative. With improvement in nearly all other departments of business, they believe that a turn in their favor is not far distant.

Geo. Griffith, shovels, &c., thinks he has done a business fully equal to that of last year, though at lower prices. Present business is sufficient for this time of year to warrant him in believing the coming year will be much better, both as to amount of business done and prices obtained.

Miller Lock Co., manufacturers of locks, have had a larger business during 1885, and a satisfactory amount on hand. Prices are lower than they should be to insure reasonable profits, and there is no immediate prospect of an advance. Their trade with foreign countries is increasing, and their productions are meeting with the favor of the trade.

Benedict & Burnham Mfg. Co., brass, report the business of the year to be somewhat unsatisfactory because of the extremely low prices received though the output of goods has been probably as great as last year. From present indications they believe matters will be much different in the near future, and more business will be done and better prices obtained.

Yerkes & Plumb, edge tools, state that the volume of business has surpassed that of last year by not less than 33 1/2 per cent., even in the face of lower prices. Their factory has been continually busy through the entire year upon ordered work, and has been run to its full capacity. They have plenty of orders at the present time, with prospects of a steady demand. An advance in price of from 5 to 7 1/2 per cent. is now being prepared, and will be announced in a very few days.

B. C. White, of Chicago, Ill., is the patentee of a machine for drawing rods or bars, the improvement relating more particularly to the bearings of the rotary screw shafts by means of which the work is drawn through the die. The inventor states that the ordinary oiled bearings are objectionable for the reason that the oil or other lubricant is liable to be forced out from between running surfaces thereof on account of the great pressure to which they are subjected. This produces heating of the bearings and causes them to be unevenly worn. The new bearing is located between a shoulder upon the shaft and a stationary part of the machine frame. It comprises two opposing disks, a series of rollers interposed between the disks, and a sleeve that is located between the disks and the shaft.

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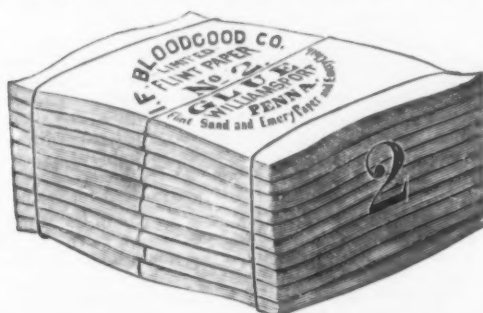
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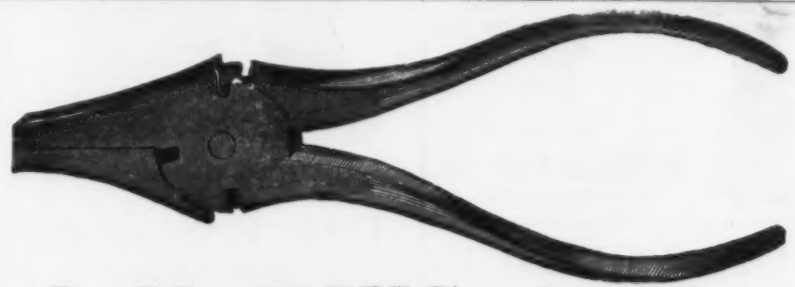
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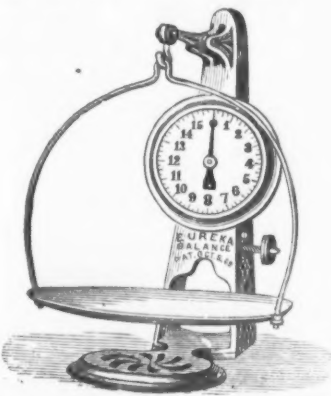
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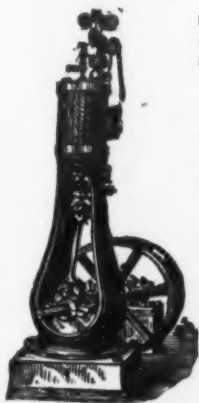
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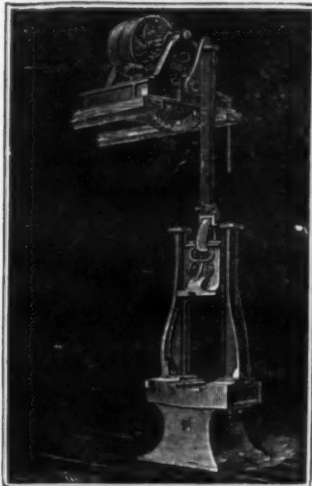
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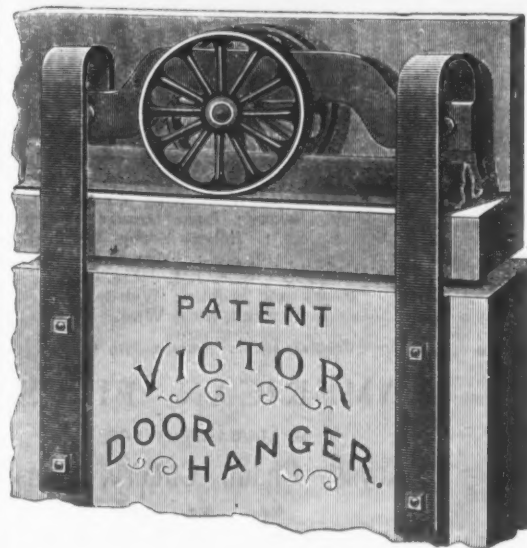
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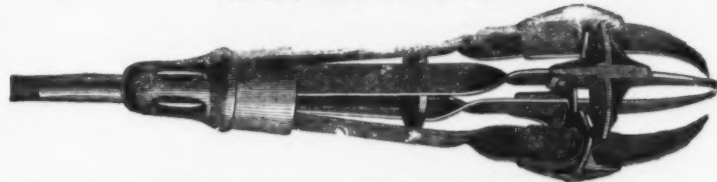
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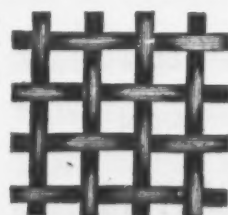
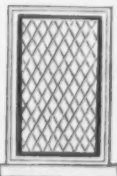
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Annual Review of the British Iron and Steel Trades.

(From Our Own Correspondent.)

LONDON, December 21, 1885.

The year now closing can scarcely be said to have been disappointing to the majority of those engaged in the British iron and steel trades, seeing that a disappointment implies a promise, and the opening of 1885 certainly was not of a promising character. The previous twelvemonth had passed away almost "unhonored and unsung," even if occasionally regretted, and the early part of 1885 brought no change worthy of mention. As a matter of fact, the absence of change has been one of the marked characteristics of the whole year, for which reason, if no other, the present annual review is much briefer, and possibly more uninteresting, than the similar contributions of some previous years. Taking this year as a whole, however, it is possible, I think, that in some cases it has not been quite so unsatisfactory as 1884, while in other (and probably more numerous) cases it has been even more wearisome and disastrous than any of its four or five immediate predecessors. In the more satisfactory examples just alluded to the experience of the recent past has been utilized to the full in the way of economizing production, while those who have been constantly worried have found no means of surpassing their former efforts in that direction. To the majority of manufacturers in the iron and steel trades, therefore, it is safe to state that 1885 has been a year of anxiety either as to employment or selling prices. Where there has been a fair amount of work, prices have been so low as to leave scarcely a safe margin of profit, while in other cases there has been the utmost difficulty in securing orders even at the barest quotations ever known in the modern records of British metallurgical operations. Throughout the whole of the twelvemonth competition has been fierce and unrelenting. The lowest bidder has generally gained the order, and only the most meager attention has been paid to quality as a measure of value. In a few instances, where quality has been an imperative necessity, this has not been so, of course, but the general run of commercial transactions has served to demonstrate that the necessity of the times has known no law but cheapness. On the other hand, it is tolerably certain that the low values which have obtained have been the means of sustaining the volume of business, which would otherwise have been on a much smaller scale, unless, indeed, it is invariably true, as is asserted, that extremely low prices are of no benefit whatever to anybody. Be the cause what it may, however, it appears to be certain that in many departments of our iron and steel trades the complaints heard from time to time during 1885 have been more in respect of selling values than the turnover; hence we may assume that much of our plant has been kept in good condition, and our labor has not suffered so much in proportion as our capital. That the latter has had a very inadequate return in many branches of the trades under notice "goes without saying." Labor has also had to give up here and there slight percentages of the wages conceded in more prosperous times, but in a general way capital has lost more than labor, even though the artisans have in many instances been restricted to four or five days' work a week. Workmen in Great Britain, taking them as a whole, are believed to have been better employed and better off than the majority of their class in any other country. Foreign competition has made no particular progress during the year, and has developed no really new phases. Here and there the forced sales of certain articles have made themselves felt rather severely, but we have gained almost as much as we have lost, and may regain the whole provided we look after it properly and insist upon equitable treatment at the hands of steamship owners and the railway companies. In restricting production sundry experiments have been tried at home and abroad. In some cases—such as the rail and tin-plate trades—the results are reported to have been decidedly satisfactory, while in others the formal arrangements have been either nullified by bad faith or have been openly broken as occasion seemed to suit. Having thus generally glanced over the year's business, I may touch upon the leading details of each quarter, albeit, as has been mentioned already, everything has been at such a dead level that there is very little variety to place on record.

First Quarter.

The month of January opened quietly, the only satisfactory feature in the crude-iron markets being the estimated reduction in Scotch stocks (which stood at about 580,000 in Connal's stores and 241,000 in makers' hands, a total of 821,000 tons) of 14,000 tons during the year. On the other hand, hematite-pig stocks had increased by 50,000 tons, and stood on the West Coast alone at 250,000 tons. Cleveland stocks had increased by about 37,000 tons (to 204,000 tons) in December; so that in these three districts only there were about 1,283,000 tons of pig iron on hand at the beginning of the year. Scotch warrants stood at 42/4; Middlesboro', No. 3, at 35/ @ 35/6, and mixed numbers of West Coast hematites at 44/ @ 44/6 ½ ton. The quarterly meetings of January were mostly quiet. At Middlesboro' on January 6 the meeting failed to impart any animation to business, which was restricted throughout and confined mostly to small purchases from the merchants, who quoted lower prices, because of the increase of stocks. The market was weaker, No. 3 being with merchants about 35/4½ on the average for early delivery. Forge pig was about 34/ and warrants were about 35/6. The prices of manufactured iron showed no change. Bars were £5 2/6; angle iron, £4 12/6; ship plates, £4 17/6 @ £5; sheets, £6 15/6, less 2½%. At Wolverhampton on January 7 the ironmasters' meeting was well attended. The tone of the gathering was quiet. Finished-iron manufacturers spoke of it as being then too early to speculate with any degree of certainty upon the probable demand. Sheet-makers generally gave the best reports as regards the extent of the sales. Competition was severe, and rates

were therefore decidedly in buyers' favor. No alteration was made in the price of marked bars, which remained at the figure which had ruled for two years before. Round Oak quality was £8 2/6, and the make of the few other "list" houses £7 10/ nominal. It was no secret, however, that shipping orders for excellent qualities of bars were filled at from 10/ to 20/ ½ ton under this quotation. Ordinary bars were £6 and common bars £5 10/ as the minimum, a reduction, compared with the prices of the January quarterly meetings last year, of nearly 10/ ½ ton. Thin sheet makers quoted stamping sheets at £12 @ £13 ½ ton, and working-up qualities at £10 @ £11. Sheets for best stamping purposes were £15. The same house quoted tin plates at 16/ @ 18/ ½ box for best cokes and 19/ @ 20/ ½ box for charcoal. Prices for galvanizing and merchant sheets varied greatly. Good firms asked as much as £7 @ £7 2/6 for singles, £7 10/ for doubles, and £8 10/ for ladders, but buyers declared that from other makers they could secure supplies at slightly less than £6 15/ ½ ton, a reduction of 10/ ½ ton on the year. The demand for hoops, strips, nail rods and other descriptions of merchant iron was not conspicuous, and rates were low. Common hoops were £5 15/ @ £6, which was also a drop of 10/ ½ ton on the year, while superior sorts were quoted £6 5/ @ £6 10/6. Gas tube strips might have been had at as low as £5 12/6. Pig iron was not active. More was done in foreign than in native brands, but the sales were under the average. The Lilleshall (Shropshire) and the Staffordshire best pig makers redeclared cold-blast pigs at 80/ and hot-blast 60/ ½ ton. In actual business, however, 57/6, and occasionally somewhat less, was nearer the real price for Shropshire hot-blast all-mine qualities. Part-mine native pigs were mostly 45/ down to 42/ ½ ton, and cinder pigs 37/6 down to 36/6. Spring Vale pigs were quoted: best, 52/6; second quality, 47/6; third quality, 37/6, but it was understood that as to the two last sorts the makers were willing to concede on good contracts quite 1/ ½ ton. Lincolnshire, Derbyshire, Wiltshire, Northampton and other foreign pigs were all very cheap. Derbyshire pigs were 42/ @ 42/6, delivered to works, and Northampton 41/ @ 41/6; common Wigan pigs, 43/6, and Thorncliffe (South Yorkshire), 55/6. At Birmingham on January 8 the market was unmistakably flat and gloomy. The announcement of a further reduction in the wages of blast furnacemen in the North of England, combined with the dullness of the Glasgow iron market, contributed to deepen the general depression, and that feeling was not alleviated by the report that a large engineering firm near Birmingham had discharged 300 workpeople. Sheet iron, which was still in leading request both for galvanizing and working-up purposes, was from £6 15/ @ £7 for singles, but very fair merchant singles were bought for £6 12/6; doubles, £7 12/6, and trebles £8 12/6. Nail rods were quoted £5 12/6; hoops, £5 10/ @ £5 17/6; tube strip about the same, and angles 6/6. Sheets of high qualities, which had been in improved request for stamping purposes, were from 11/ to 13/6. Next to the sheet-makers, perhaps, those who were doing best were the makers of angles adapted to the various manufacturing requirements of the district. In some cases angle-makers reported their order-books filled for the whole of the half-year, though at very low rates. The galvanized-sheet makers held their customary quarterly meeting, but the proceedings, being of no public interest, were not communicated to the press. No scarcity of orders was experienced in this branch, but the prices were such as few Staffordshire makers ventured to accept. The current quotation for galvanized 24 gauge was £11 5/ @ £11 10/6, as against £13 at the same date of 1884. At the quarterly meeting of the South Wales' tin-plate trade, held at Birmingham on January 8, under the presidency of Mr. Flower, of Neath, there was a moderate attendance. The reports presented were somewhat discouraging, for, although the year's exports had been larger than ever—viz., 288,708 tons, against 269,375 in the previous year, and 265,039 in 1882—it was stated that little or no profit had been realized by makers, while the majority of them had sustained a loss. Two or three tin-plate works had been laid off. The prices quoted on the market were about 1/ ½ box less than at the previous quarter day, viz., 14/ ½ box for common Welsh coke, and 16/ for charcoal, but some concession from those figures was needed to effect sales. These values and conditions held up to the end of January, although there was a declining tendency toward the end of the month. February brought no improvement; indeed, Scotch warrants receded to about 42/6, Middlesboro' No. 3 to about 35/6, and mixed numbers of hematites to 44/6, while tin plates were quoted at 13/3 @ 13/6 ½ box for ordinary cokes. The decline continued as the month proceeded, Scotch warrants going to 41/1½; and Middlesboro' No. 3 to 34/6 ½ ton. A moderate turnover was being done, but there was no life in the market, and the Board of Trade returns continued highly unfavorable. The beginning of March brought a considerable amount of tension in political matters, and something like a panic on the London Stock Exchange, owing to persistent rumors of a probable war with Russia. Somewhat more work was done in certain branches in connection with the Sudan expedition, but the general condition of the trade underwent no improvement. Steel angles were raised in price in Scotland, but that appeared to be a totally exceptional change.

Second Quarter.

The advent of April brought no change of moment. Scotch warrants were about 41/11, Middlesboro' No. 3 foundry was 34/6, and mixed numbers of hematite pigs about 44/ ½ ton. At the quarterly meetings there was no great amount of business done. At Middlesboro' on April 7 there was next to no business transacted, owing to the holidays. The foundries were taking out but little iron. Ship plates were £4 15/; ship angles, £4 10/6, and common bars, £4 7/6, all less 2½%. At Wolverhampton on April 8 the meeting could scarcely have fallen at a more inopportune date, since, being Easter week, most of the works were closed. Business was any-



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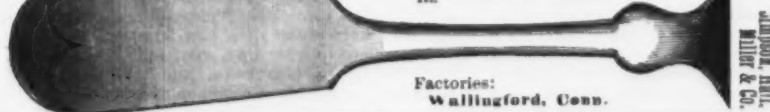
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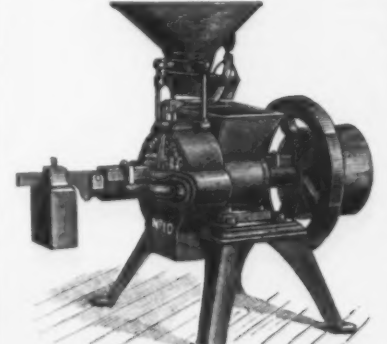
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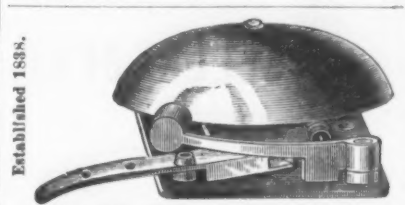
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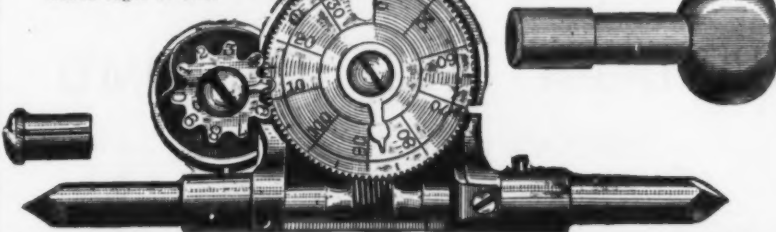
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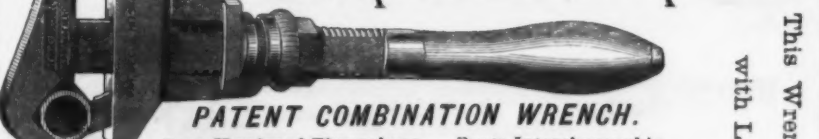
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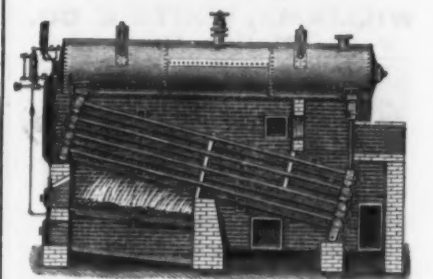
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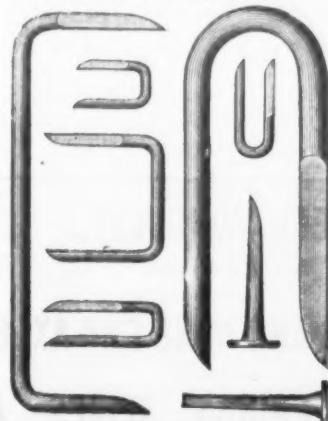


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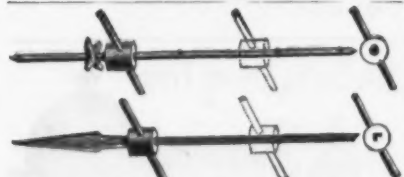
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thing but brisk. Makers of all-mine pigs, headed by the Lilleshall Co., redeclared the earlier quotations of 80/ for cold-blast pigs and 60/ for hot-blast. Such figures, however, were only nominal, and sales, if effected, had to be on the basis of 55/6 @ 57/ for hot-blast pigs. Second class Staffordshire pigs were an average of 40/ @ 42/, and cinder pigs 34/ @ 36/3 in actual business. Alfred Hickman & Co. quoted hydrates £2. 12/6; mine iron, £2. 5/, and common, £1. 17/6. Mr. David Kenrick quoted 40/, and other Staffordshire makers were in proportion. Competition was keen, and buyers naturally enough made the most of it. Prices were easy all round. Derbyshires were named as 41/ @ 42/, delivered to works, but some lots changed hands at 40/. Northampton was 38/6 @ 39/; North Staffordshire pigs were quoted 42/, but the full price could not be realized. The manufactured-iron trade lacked animation, and the orders given out were of small extent. Sheets sold better than any other description, but even in this branch the demand was by no means flourishing. Marked bars (Earl Dudley's) were redeclared at £8. 2/6, and £7. 10/ for the other "list" firms. But at 10/ @ 20/ less 3/ ton excellent branded bars were to be had in abundance by merchants doing an Australian and other colonial business. Second-class bars were £6, and common £5. 10 down to £5. 5/. Good hoops were £6. 5/, and common £5. 10/; £6. 5/ @ £6. 10/ were named for merchant singles. Galvanizing doubles were £7 @ £7. 5/, and latens £8 @ £8. 5/. E. T. Wright & Sons refused to quote less than £7 for singles, £7. 10/ for doubles, and £8. 10/ for latens. Their boiler plates were £8 3/4 ton and upward for the Wright quality, and £8. 10/ and upward for the Monmoor brand. Galvanized corrugated sheet makers did not give a brisk account of the demand nor of the prices ruling. The Wolverhampton Corrugated Iron Co. named 11/10, Liverpool, as their quotation for 24 B. C. bundles. At Birmingham on April 9 the meeting was largely attended. Nominal prices were the same as those just given. Some of the largest producers of marked iron made no secret of their conviction that the interests of the trade would be better served by a closer approximation between nominal and actual prices, but they were overruled by one or two old, conservative firms, who are interested in iron mainly as a factor in upholding the prices of and royalties upon coal. Common bars were in abundance at £5. 10/ and even less, some large transactions being reported at £5. 5/, while common sheets ranged from £6. 10/ upward for singles, £7 for doubles, and £7. 15/ for latens. Marked sheets were £9. 10/, but those of J. Bagnall & Son, Limited, were quoted £9. High-class sheets of the Severn brand are £12 and Wilden B £13. Since the break up of the drought in the Australia good orders were coming to hand for Netherthorn bars and BBH and other favorite brands of sheets, but there was a great scarcity of American orders, and in other respects the shipping trade in iron was at a very low ebb. The customary quarterly meeting of the galvanized-iron trade was held in private, but no change was made in prices. The quarterly meeting of the tin plate trade was held at Swansea on April 2, when Mr. Flower presided and about 34 works were represented. There was a great deal of discussion on several points. A committee had been appointed at the last meeting at Birmingham to consider the question of the cause of black spots on tin plates, and how to provide a remedy. In reply to Alderman E. R. Daniel, it was said that that committee had not yet reported. A suggestion was then made that the committee should consider the question of offering a premium for some method of obviating these spots. It was understood that the committee would fix upon the amount of the premium and report to the next quarterly meeting. On the question of price it was agreed that it should stand at 14/ 3/4 box, and that sellers should ask more, and not less. On the subject of the restriction of make there were two propositions. The first was to stop all the works for one week in every quarter. This was discussed, but not decided upon. The second proposition was to stop the works for one week at Whitsuntide, and this seemed to meet with much favor. Ultimately it was agreed that the permanent committee should be asked to draw up a scheme for restriction of make and report to a special meeting. By the end of the month some values had further declined, but in other lines, such as steel angles and sheets, more work was reported to be in hand. Probably a better state of things would have come about had it not been for the continued political complications. May came in quietly, and the iron markets were irregular, owing to the political excitement of the time being, and the general fear that war would take place with Russia. Values of almost all kinds were rather low in consequence, but in many of the branches of the iron and steel trades a good deal of work was in hand on Government account. The Scottish mild-steel works were also so well engaged that they again advanced angles 5/ 3/4 ton, and ship-plates 2/6 3/4 ton. By the middle of the month there was less political tension, owing to the impression that the Afghan difficulty had been settled, and a somewhat better feeling was tentatively evident, owing to the relaxation of freights. The Whitsuntide holidays were very fully observed, and the month came to an end without there having been the improvement which not uncommonly takes place during May. June opened no better than its predecessor—in fact, the complaints of dullness seemed to be emphasized, and the universal keenness of competition certainly assisted in pushing down selling values to even lower levels than had been reached previously. This was demonstrated by the official return of the sworn accountant to the Northern Board of Arbitration, showing that the average net selling price per ton was 1/ 3/4 ton lower than in the previous two months. In the iron market there appeared to be "no bottom," and the nominal quotations afforded no safe criterion of the actual values. The demand remained dull and languid, and many of the concerns had some difficulty in keeping their men and plant in operation even for five days a week. The unfavorable

nature of the Board of Trade returns for May added to the depressed tone, and brought Scotch warrants back to 41/ 1/2, and Cleveland No. 3 to 32/, while hematite pigs were about 43/ 3/4 ton for mixed lots. With the resignation of the Government there came further political complications which in no way assisted trade, even if they did no particular harm. The first half of the year, therefore, closed with as much languor and scarcity of new businesses as had been noticeable any time during the preceding six months.

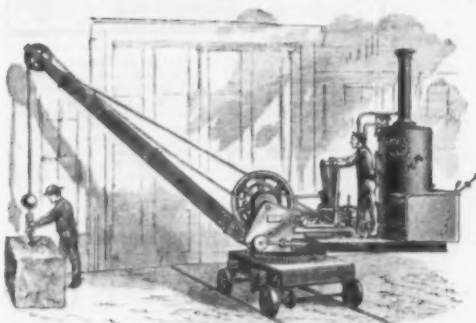
THIRD QUARTER.

The second half of 1885 and the month of July began with a new Ministry just in office, and with a somewhat more settled state of affairs abroad, but commercial matters generally did not amend, and the iron trade in particular was not any stronger. Scotch warrants stood at 40/10, Middlesbrough No. 3 at 32/ and hematite at 43/ 3/4 ton. Reserve stocks were everywhere heavy and growing, and the only departments which showed more activity were the tin-plate and black-sheet mills. Just prior to the quarterly meetings several failures happened in the Midland iron trade, and the outlook was not improved thereby. In respect of the quarterly meetings the accounts were not very cheerful. At Middlesbrough on July 5 there was scarcely any business done. The manufactured-iron trade was very sluggish, and the demand kept down to a very low point. There were no indications of improvement, as the reports regarding shipbuilding were less favorable, especially as to iron plates and angles. Steel for shipbuilding was in good request, but the rail trade was quiet, taken as a whole. Steel rails were £4. 15/; manufactured-iron bars, £4. 15/; angles, £4. 10/; ship-plates, £4. 15/; less 2 1/2 %; puddled bars, £3. net. Foundry work was not very plentiful. At Wolverhampton, July 6, the meeting was well attended. There did not appear to be much desire to enter into forward contracts of much magnitude either by sellers or consumers. The Lilleshall Iron Co., Shropshire, determined to make no alteration in their quotation for all-mine pigs, and redeclared cold-blast sorts at 80/ 3/4 ton and hot-blast sorts at 60/. This lead was followed by the Staffordshire makers, one or two of whom, indeed, asked as much as 62/6 for hot-blast all-mine. Purchasers mostly declined to advance upon 55/ or 57/6. Staffordshire part-mine were varied in price. They might be said to range from 40/ to 45/, although in a few cases 37/6 was named. Cinder pig was 35/ up to 36/6. The Spring Vale make was quoted at: Hydrates, 52/6; mine, 45/3, and common, 37/6. More business was done in Derbyshires and Northampton, and other similar classes of iron, than in native makes, and agents reported that during the preceding fortnight or three weeks considerable sales had been effected. Derbyshire pigs were 40/ 3/4 ton, easy, and Northampton 38/. Firms making finished iron who have not a considerable merchant connection were doing the least, except in cases where galvanizers were specially catered for. Orders for sheets from these last buyers were arriving in moderate numbers. Marked bars were redeclared at £7. 10/, a quotation which had prevailed for some two and one-half years, while Earl Dudley's bars were £8. 2/6. It was generally conceded that W. Barrows & Sons and the New British Iron Co. were almost the only people who were standing out for the £7. 10/ price, and that the majority of the high-class bar firms were selling at £7, with £6. 10/ as the quotation for their second-class qualities. Medium qualities were £6 and common £5. 5/ @ £5. 10/. Common hoops were £5. 10/ @ £5. 15/, and superior qualities 10/ additional. Gas-tube strip was £5 @ £5. 5/ and upward. Rates for sheets were irregular. Hard doubles changed hands at £6. 15 @ £7, and latens at £7. 10/. Good boiler plates were quoted £8 @ £8. 10/, and tank plates at £7 upward. At Birmingham on July 7 the meeting was numerously attended, but it was scarcely an improvement upon its predecessor in point of business. The market was disturbed and depressed by adverse reports and apprehensions affecting the stability of different firms, and before the close of the day it transpired that two iron-making firms and two merchant houses were under the necessity of facing their creditors. The attendance of London and Liverpool buyers was below the average. There was very little business offering for shipment, and, as manufacturers generally refused to make further concessions, the few indents were withheld. For local consumption a fair number of small transactions in bars, sheets and pig iron took place, and some good transactions in cheap Welsh bars were reported. Sheet-makers bought pig iron in lots of 500 and 1000 tons, chiefly hematites and Derbyshire, but the prices were not allowed to transpire. The quarterly meeting of the galvanized-iron trade was held in private, and no report was made of the proceedings. It was understood, however, that the makers present generally acknowledged the possession of considerable orders, but at prices which left them only the barest margin of profit. The tin-plate makers had just completed their arrangements to stop production one week out of every four, which had the effect of strengthening values, and, generally, of ameliorating the prospects of the industry. The hot weather of the month interfered with the output in some cases, but its broader influence upon trade was decidedly beneficial, inasmuch as the continued heat materially improved harvest prospects. The commencement of August brought nothing new except the usual holiday season and vague reports here and there of a little more steadiness in some branches of the iron and steel trades. That steadiness did not imply an augmentation of the demand, but rather a slowly growing impression that prices had seen their lowest and must surely amend. The tentative, hopeful tone probably received some encouragement from the harvest operations, which were commenced and carried out in many parts of the country under very favorable conditions. About this juncture it was officially stated that the make of pig iron during the first half of the year had decreased by 184,125 tons, while stocks had increased by 243,386 tons, or approaching 500,000 tons lessened turnover—a statement

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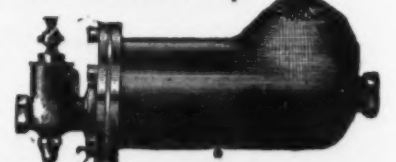
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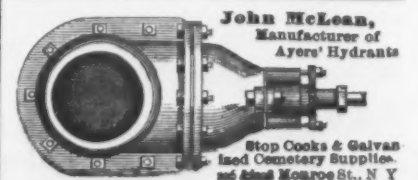
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tents, citing recent court decisions. Mention this pa-
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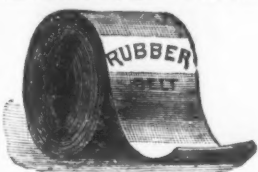
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Pat. 6545

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Pat. 11,208, 213,601.

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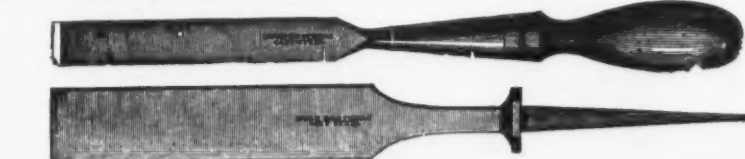


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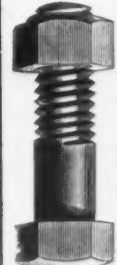
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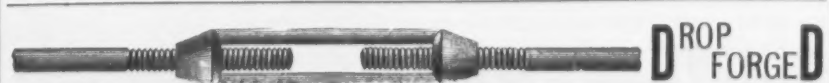
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which had no very good effects upon the
market. Toward the close of the month,
nevertheless, a rather better tone prevailed,
mostly owing to the better reports received
from the United States. When September
commenced, therefore, this tone was in-
clined to take the form of optimism, and it
was rumored that numerous inquiries had
been received from American buyers for pig
iron. The sheet-iron rollers raised their
prices by 2/6 $\frac{1}{2}$ ton, and the galvanized-
sheet producers by 5/ $\frac{1}{2}$ ton, both being
said to be busier than for some time pre-
vious. Then the newspapers began to write
about the improvement in the iron trade,
and it might have been supposed that we
had started an uproarious boom at the
shortest possible notice. The speculators at
once saw the possibilities of the situation,
and began dabbling in warrants, which
advanced by 1/ $\frac{1}{2}$ $\frac{1}{2}$ ton, and caused
crude irons generally to be more firmly
held. On September 8, indeed, Glasgow
warrants touched 43/11—a rapid rise as
compared with 41/8 on September 1. Men
of experience in the trade failed to observe
any really valid reasons for the change, but
they could not and did not object to benefit
by it, which some of them did to the extent
of 1/ or 2/ $\frac{1}{2}$ ton above the recent selling
rates. This was the case even in some
kinds of finished iron, the greater firmness
of which doubtless had something to do
with the augmented demand for various
sorts of hardware. A process of filling up,
indeed, began, and in several departments
attained welcome proportions, although there
was never the remotest possible approach to
a boom. As the month closed American
advices continued cheerful, and values
showed symptoms of a steadiness which
augured well for the future.

Fourth Quarter.

The advent of October was characterized
by a generally quiet but steady tone, with a
considerable amount of business in hand,
and great watchfulness on all sides for any
symptoms of a further amelioration of the
demand or values. Under these circum-
stances more than ordinary interest at-
tached to the quarterly meetings of the iron-
masters, merchants, &c. At Middlesboro'
on October 6 there was not only no increase
of business, but the trade seemed to be
worse. The makers who were well sold
quoted high rates, the merchants quoted
32/4 $\frac{1}{2}$ for No. 3, and 1/ less for No. 4
forge for early delivery. The leading fin-
ished-iron departments—plates, bars and
angles—were very quiet indeed, and prices
were not maintained. Manufacturers asked
for ship angles, £4. 10/; common bars,
£4. 12/6 @ £4. 15/; ship-plates, £4. 12/6 @
£4. 15/; sheets, £6 @ £6. 5/; less 2 1/2 %.
Puddled bars were £3, net. At Wolver-
hampton on October 7 the meeting was
rather better than that of July. The im-
provement was apparent in sheets more than
any other articles, but the pig vendors like-
wise spoke of revived purchases. The
Lilleshall Iron Co., Shropshire, declared no
alteration in their quotations, which were
nominal, at 60/ for hot-blast pigs, and 80/
for cold-blast. The bulk of the actual busi-
ness done was at 55/ @ 57/6 for hot-blast,
and proportionate figures for cold-blast.
Staffordshire all-mine makers quoted at
55/ up to 60/ for hot-blast, and 75/ up to 80/
for cold-blast, but without much business.
Staffordshire part-mine were 37/6 @ 45/; and
cinder pigs mostly 32/6 @ 35/. The Spring
Vale Co. quoted 52/6 for hydrates, 42/6 @
45/ for mine and 35/ for common. Derby-
shire and similar class pigs were an average
of 39/ @ 40/ $\frac{1}{2}$ ton delivered, though some
vendors quoted 41/6. Northampton were
priced at 38/ @ 39/. Marked bars were
declared at £8. 2/6 $\frac{1}{2}$ ton for Earl Dudley's
make, and £7. 10/ for those of the other few
leading houses. It was fully understood,
however, that, except in the case of about
three firms, export orders were being filled
at £7 $\frac{1}{2}$ $\frac{1}{2}$ ton, and these firms offered a second-
quality bar at £6. 10/ down to £6.
Common bars, too, were slow of sale at
£5. 10/ down to £5. 5/ as a minimum.
Common hoops were £5. 10/ and superior
£6 @ £7. 5/ $\frac{1}{2}$ ton for hard doubles, which
was an advance of between 5/ and 7/6 $\frac{1}{2}$
ton upon the quarter, and £8. 2/6 @ £8. 5/
for lattens. Singles were an average of
£6. 15/ @ £6. 17/6. At Birmingham on
October 8 there was a decidedly better tone
all around than at the midsummer meeting.
On this occasion the market, though not
active, was steady, and prices of sheets,
bar and tin plates ruled higher than at the
previous meeting. Pig iron was the same as
at Wolverhampton the day before. At the
private meeting of the galvanized-sheet
trade the makers present reported a good
demand, and in several cases stated that
they were obtaining 7/6 @ 10/ advance
upon the prices ruling the previous quarter.
A proposal to declare a fresh minimum
advance of 5/; making 10/ in all,
was withdrawn. Specifications for several
hundred tons of sheets, chiefly for
Australia, were placed with different Staf-
fordshire makers, but in every instance the
full advance was enforced. Makers of black
sheets, though less united than the galvaniz-
ers, were sharing in the general improve-
ment, and prices in this department were
2/6 @ 3/6 higher than at midsummer.
Some of the angle-makers were busy, for
local consumers chiefly, in common with the
safe and bedstead branches, but in most
other departments the iron trade was re-
ported very slack, and complaints of the
competition of steel were general. Some sen-
sation was caused by the importation of
American charcoal pig iron into England,
and various deductions were drawn there-
from, but the simple fact afterward appeared
to be that the iron was of a special sort and
imported for a special purpose—namely, the
manufacture of malleable-iron castings.
Some feeling was also excited by the placing
of an order for steel sleepers in Belgium by
the Midland Railway Co., but this occurrence
was explained to be isolated, and the com-
pany have since given out orders for the
sleepers to British Bessemer concerns. To-
ward the end of October the market became
rather less hopeful, and values were more
irregular, notwithstanding the fact that a
considerable turnover was still being effected
in different parts of the country. In the
North of England the wages arbitration re-
sulted in a drop of 2 1/2 % on mill and forge
pay, and of 3d. $\frac{1}{2}$ ton on puddling. The in-

coming of November reminded the trade
that the end of the year was rapidly ap-
proaching, and that great activity would be
needed to "keep up the returns," especially
in view of the general election. Iron and
steel prices remained quiet and irregular on
all sides, and the reserve stocks were steadily
increasing in Scotland and elsewhere, con-
currently with diminished shipments and an
uneven home consumption. The greater
part of the month was much disturbed by
the electioneering whirlwind, which was de-
cidedly detrimental to business. Toward
the end of November, however, and, de-
spite the elections, certain values grew
better, and the reports from the United
States showed that the market there was
undergoing a favorable development, accom-
panied by inquiries in this country from
buyers there for prices and supplies
of Scotch and hematite pig iron, spiegel
and steel rails. In the early part
of December these American inquiries
assumed the more practical shape of orders
for moderate lots of Scotch pig, somewhat
large parcels of hematite pigs, and a lot of
10,000 tons of steel rails. The last-named
transaction, however, was an exceptional
one, and not a fair criterion of the general
demand, inasmuch as the rails were to be
made of hammered blooms. Nevertheless,
these transactions tended to support the
market, and values became steadier in al-
most all kinds of crude iron, while the steel
works were also better employed, owing to
the giving out of large orders for sleepers.
The rail mills also had more work. Since
then, and especially since the termination of
the appeal to the electors, matters have been
quiet, but fairly steady. They will probably
remain so up to the end of the year, with
much caution in concluding forward con-
tracts, under the impression that a forward
movement is not at all unlikely to set in
early in the new year. In the result, there-
fore, the present twelvemonth is ending
rather more favorably than it began, in point
of the tone of the market. It has not been a
prosperous year by any means, but if it
should be succeeded by even a moderate im-
provement its lessons will not have been
learned in vain.

Welding Iron and Steel.

A series of experiments were undertaken
by Prof. J. Bauschinger at the instance of an
engineering firm. Similar experiments had
been previously made at the Royal Mechani-
cal Technical Experimental Institute, at Ber-
lin, and by Mr. W. Hupfeld, at Prevali, which
gave very different results, those at Berlin
being very unfavorable, those at Prevali
very favorable, as regards the welding capa-
city of steel. Professor Bauschinger recapitu-
lates the main results of these tests before
describing those made by himself. The ma-
terials used in the latter were steel, from the
Feine Iron Works, at Hanover, and bar iron
of various sections from the Neuhoffnung-
shütte, near Herbar, in Nassau. The test
pieces were flat, square and round in section,
the largest being 3.149 by 1.181 inches. Each
piece was cut in two cold, swelled up on the
anvil, when hot, 3.196 to 0.392 inch, and
after heating to the proper degree, the two
portions were laid on each other and welded
together by hand or steam hammer. Some
preliminary studies were made in the labo-
ratory of the college to ascertain the best
method of welding and the best flux for
steel; quartz sand answered the latter pur-
pose, while it was found that a rather less
degree of heat was required for steel than for
wrought iron; a pure coal fire was used.

In the chief experiments the steam ham-
mer was employed. Every piece after weld-
ing was tested in the usual way for tensile
strength, the limit of elasticity, contraction,
extension and ultimate strength being de-
termined, the same quantities having been
measured for pieces of exactly similar qual-
ity, section and length, but without a
weld. Both for steel and iron the limit of
elasticity is nearly always reduced by weld-
ing, and this is, without exception, the case
as regards the extension; the contraction of
welded is less than that of unwelded pieces
when the fracture takes place in the welded
portion. The general conclusions arrived
at are that for steel the best welding tem-
perature is just at the transition from a red
to a white heat; a quick fire and smart
handling are necessary, as the pieces should
not be long in the fire.

Analyses were made of three samples, one
of which welded admirably, the second badly
and the third not at all. Professor Bau-
schinger is of opinion that in the case of mild
steels, such as those tested, with a low car-
bon, intended to take the place of bar iron,
success or otherwise in welding depends less
on the chemical composition than on the
mechanical treatment.

Mr. Samuel M. Wickersham, iron broker,
Wood street, Pittsburgh, has furnished the
Pittsburgh Times with an extract from a
diary kept by him of a trip from Pitts-
burgh to Lake Erie 54 years ago, and a
visit to the lighthouse at Erie, which was
then supplied with natural gas. It pos-
sessed a distinct interest, and is as follows:
"JUNE 7, 1831.—We arrived at Portland
(30 miles east of Erie) at 5 o'clock p. m.
The road was very fine and the country was
well cultivated. We staid at Portland all
night, and while we were there we went
along the beach, where the stones are nearly
all flat and many of them very handsome.
Here are found many curious petrifications.
It is a very pleasant walk along the beach
in the afternoon. The going down of the sun
is a very splendid sight, as it seems to go
into the lake. We also went up in the light-
house. This is lighted up with natural gas.
The lighthouse is 50 feet high. The gas is
got from a burning spring about 1/4 mile
off. The gas is taken to the lighthouse
through a wooden pipe. We also went down
to the burning spring, taking with us a can-
dle, with which we set fire to the gas as it
came up out of the water. The gas bubbled
up through the water over several acres of
swamp. In one place, the keeper told us,
were a large number of bubbles continually
coming up, and over this spot a tower of
perhaps 20 feet diameter was erected and
connected by a wooden pipe to the lighthouse.
In this way enough gas collected during the
day to supply the lantern all night."

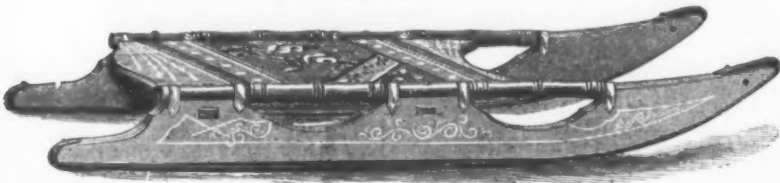


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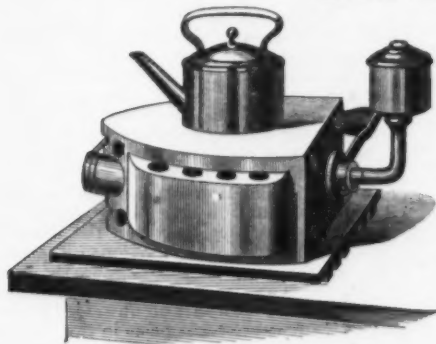
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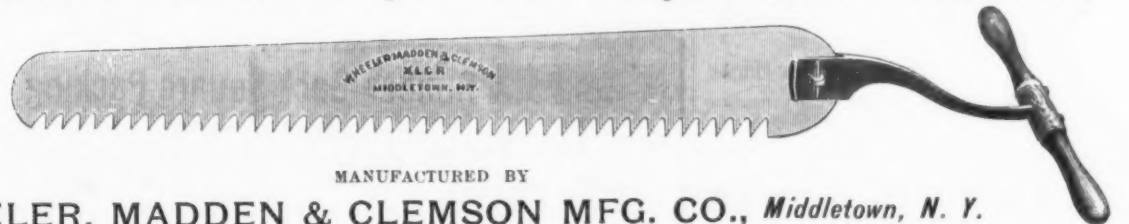
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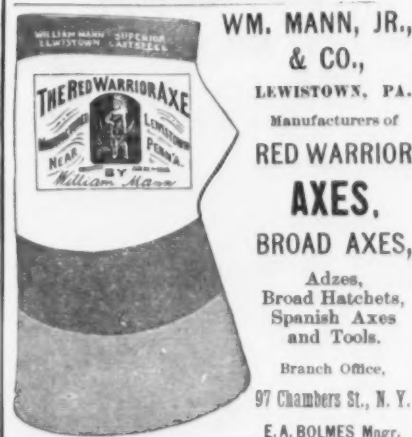
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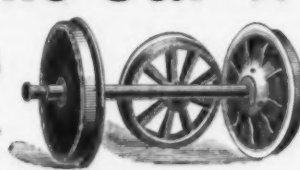
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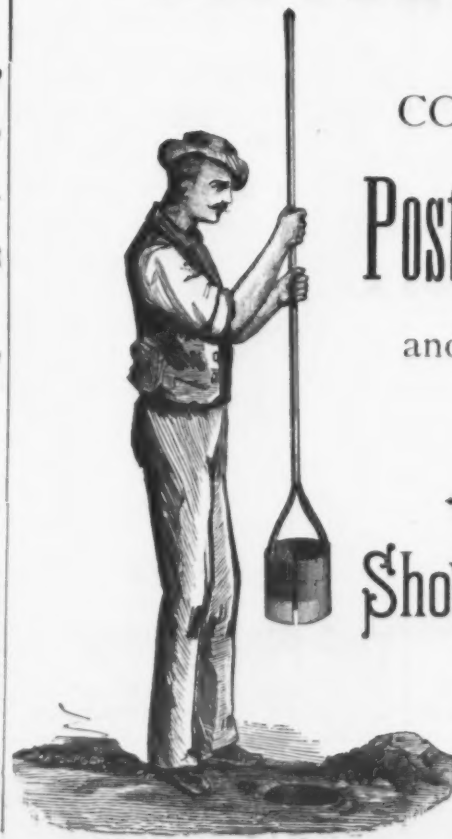
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Safety, Economy in Fuel, Low Cost of Maintenance, Dry Steam without Superheating, Large Reserve Power,

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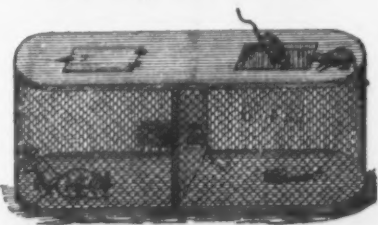


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The "BOSS" Trap.

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Bright Metal Cages, in Brass, Bronze and Silver Plate.

NEW AND BEAUTIFUL DESIGNS JUST OUT.

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The Original Inventors and Manufacturers of the

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SCIENTIFIC AND TECHNICAL.

Hoisting from Great Depths.

Prof. J. Hrabak, of Austria, in discussing the means that will have to be adopted to raise ore or coal from depths exceeding 1000 meters, points out that that depth was reached in 1883 by the Przibram mines, and that several collieries are rapidly approaching it. He shows, says the *Colliery Guardian*, that the ordinary method with ropes of any form whatever will be practically impossible when the ore has to be raised 1200 meters without the use of supplementary engines placed lower down the shaft, and that even these would not enable the ore to be raised from depths greatly exceeding 1200 meters. The method that, in principle at least, would enable the ore to be raised from almost any depths is the pneumatic system which has been in use since 1876 at the Epinac Colliery, in the South of France. The results obtained have been very satisfactory, but as the cost of a pneumatic plant would be greatly in excess of a rope one it is very improbable that it will come into general use as long as it is found practicable to employ ropes. Having this in view, the author proposes a method by which he considers it will be possible to overcome the difficulties attaching to the ordinary rope arrangements. He proposes to increase the width of the shaft for half its depth to such an extent that, besides the two principal winding divisions, two secondary ones could also be arranged. Through the principal divisions the winding would be effected by ropes that reach to the bottom of the shaft, and they would be worked in such a manner that, while half the length of each was wound upon the drum, the other halves would hang down the shaft and counter-balance one another. The ore would be raised by these ropes half the height of the shaft, and would be lifted the remainder of the distance by the secondary ropes. This method of winding would be expensive on account of the enlargement of the shaft and the necessity for two winding engines. The expense would, however, be compensated for by the winding power being increased by 50 per cent.

The Abt System of Working Steep Inclines.

At the second October meeting of the American Society of Civil Engineers Mr. W. W. Evans read a paper under the above title, giving some interesting historical notes on the general question of working steep inclines, and likewise gave a more particular description of the latest, and in some respects probably the best, system of rack railroad which has been as yet devised—the Abt system. The most notable feature of the latter, which makes it, so far as yet appears, so great an advance upon others, is the ease with which the transition from working by the rack and running by adhesion in the ordinary way is made. Under it a train may approach the foot of a rack grade at pretty high speed while running by traction in the usual way, and, by the peculiar construction used, the rack engages with the gear-wheels certainly and simply, without shock or wear, the engine continuing to work by adhesion, as before, but supplemented thereafter by the rack engine. The following is a brief summary of Mr. Evans' paper: Reference is first made to the various experiments that have been made in the past for the transmission of loaded cars up steep inclines, instancing the English patent of Blenkinsop in 1811 for a rack on the line of railway, with the driving-pinion on the locomotive, laid near Leeds in 1812, and which was worked for the transmission of coal for over 20 years on gradients of 1 in 15. This method was not applied, however, to any of the regular railway systems, which, in their earlier development, were supposed to be only practicable for locomotives for gradients less than 1 in 100, the steeper inclines being overcome by means of planes with rope traction. In 1847 an application was made of a rack-and-pinion arrangement at the inclined plane at Madison, Ind., with an average grade of 1 in 17, and a length of 7040 feet, and with a curve of 800 feet in length and 1000 feet radius. This was worked successfully until 1868, when very heavy locomotive power was adopted depending upon adhesion. (This plane and its arrangements are described in Paper No. 158 of the "Transactions" of the Society, March, 1878. Other inclined planes are described in the "Transactions" for August the same year.) About 1849 Mr. George Escol Sellers proposed a smooth center rail, with horizontal friction rollers pressing against it, and the first engines for the Panama Railway were built upon that system, but the construction of that road with much lighter grades than had been expected led to the abandonment of this system. In 1867 Fell applied the same idea to the railway cars at Mont Cenis. In 1866 the Mount Washington Railway was built by Mr. Sylvester Marsh with a center-rack rail in the form of a wrought-iron ladder. This was finished in 1869, and has been worked with entire success ever since up to the present time. About the same period Ruggenbach proposed to construct the rack rail for the St. Gothard Railway; and in 1871 the Rigi Railroad was opened, with a wrought-iron ladder rail constructed by the same engineer. He also constructed a railway in Switzerland which was made up partly of rack rail sections and partly of simple adhesion sections. There have now been constructed about 25 miles of rack rail ways in Europe, which are all in regular operation. On account of many defects and difficulties in operating the ladder rail upon steep inclines Mr. Abt has invented a method which consists essentially of a number of racks placed side by side. The racks are simple bars, side by side, provided with teeth, bolted and connected by metal chairs and bolts, and laid so that the teeth are not at the same location in the contiguous bars, but are arranged so as to permit the simultaneous contact of several teeth of the pinion-wheel with different bars of the rack, which produces a smoothness of motion never obtained with the ladder rails; also giving a security against fracture of the teeth, and permitting pinions so much smaller in size that multiple gearing is unnecessary. The pinion-wheels are constructed of separate disks, and are so arranged with elastic connection that they have a smooth motion relative to each other, thus counteracting the effects of any slight inaccuracies in manufacture. Motion is obtained by this system which is perfectly smooth and free from blows and irregularities at a speed of 16 miles an hour, and this without the disagreeable noise of the ordinary rack rail. This system is also applicable with great facility to curves of any practicable radius; it can also be cleaned with ease by a device on the locomotive. The crossings and switches are made without difficulty, and transitions from this method to ordinary traction rails, and the reverse, are made practicable and easy by an ingenious perpendicular movement of the first set of rail bars. The locomotives of this system are made with independent steam cylinders, thus permitting the adhesion drivers to work alone on the ordinary portions of the line, and permitting the rack and pinion to supply the additional traction when on rack-rail systems. This system has been applied to what is called the Hartz Railway, with gradients as high as 1 in 16½. Another road in Baden is in course of construction, which will be, in its steeper portions, laid with this system, and also another in Bavaria with very steep grades. It is claimed that this system can, with the best results, be applied to many portions of existing lines and to the connections of otherwise impracticable points with existing lines.

Gilding on Ivory and Glass.

One plan for gilding ornate designs on ivory or glass is to paint over the design with a fine camel's-hair brush moistened with nitro-muriate of gold. Then hold the glass or ivory thus painted over the mouth of a flask in which hydrogen gas is being generated (by the action of dilute sulphuric acid on zinc scraps). The hydrogen will reduce the gold chloride to metallic gold on the painted surfaces, and the gold film thus deposited will in a short time be found to have considerable luster, when the operation may be stopped. The gold film is exceedingly thin. Another method suggested for the same purpose, which will answer for glass, is the following: Make some gold powder by putting into an earthenware mortar some gold leaf with a little honey or thick gum water, grinding the mixture until the gold is completely reduced to powder, and then washing out the honey or gum by repeated additions of warm water and decantation. Mix the gold powder with a strong borax solution, and paint over the design with it. When dry, place the glass in a stove and give it a considerable heat. This will vitrify the borax and cement the gold to the glass with much firmness.

The Swan Portable Electric Mine Lamp.

Mr. Joseph W. Swan has been giving close attention to the problem of lighting in collieries with the aid of a portable lamp. The latest model produced by him was shown at the last meeting of the North of England Institute of Mining and Mechanical Engineers, at Newcastle. He has produced a lamp and battery combined capable of giving during 10 or 12 hours twice or three times the light of a common safety lamp. On first lighting it gives the light of two candles, and, after 10 hours about one and one-half candles. As in the earlier lamp, the light comes from a filament of carbon sealed air-tight in a small tube, and this tube is protected by a bull's-eye of glass so strong as to be practically unbreakable. The current necessary to render the filament incandescent is generated by cells contained in the case. For regular mine working these are composed of lead and lead oxide. This kind of cell is what is termed a "secondary cell," or one which is recharged by being connected for a time with an electric generator, such as a dynamo. Another kind of cell can be used, composed of zinc and lead oxide, with a special view to the occasional employment of the lamp for exploration in vitiated air. This is a primary cell, and only requires filling with liquid to make it ready to give light. It will sometimes be convenient to have a duplicate lamp within the bull's-eye, with a switch connection to enable either, but not both, to be lighted, so that in case a lamp should fail the miner will not be left in the dark. In a fourth modification there are only two cells, instead of seven, to light a lamp. By this arrangement the weight is diminished to between 5 pounds and 6 pounds. Speaking of the weight it is perhaps necessary to point out that that is proportional to the light yielded and the time during which it is kept up. By taking from the electric lamp as small an amount of light as the ordinary safety lamp gives, its weight need not much exceed that of the heavier lamps in common use. Being that a good light is the most important point to be gained, after safety, the Swan electric lamp has been constructed to give two or three times the light of the ordinary lamps, and consequently it is heavier—in fact, weight has been made subordinate to light; but it is hoped that the weight and size of the present lamp will not be found unhandy. The apparatus could have been made much lighter if it had been permissible to employ a primary battery instead of a secondary one; but it appears to be only allowable to use a primary battery to meet sudden emergencies, and in those cases where there is no dynamo and no regular system in operation for charging secondary batteries. For mine exploration, where the air is very foul, as, for example, after an explosion which has destroyed the ventilation of the mine, a lamp of this kind with a primary battery, in conjunction with a Fleuss breathing apparatus, will probably be found very useful; and it is worthy of consideration whether a certain number of lamps of this type, with a primary battery, ought not to be kept ready to be used in case of accident at every pit liable to a fire-damp explosion. But as a substitute for the ordinary safety lamp for general underground lighting, a battery which requires each time it is used to have the spent charge emptied out and a fresh charge poured in, and which also requires frequent renewal of the positive plate of each cell, is impracticable. On the other hand, a secondary battery, such as that adopted by Swan, can be charged with even less trouble than attends the trimming of an oil lamp. It is only necessary to insert a couple of wires from an

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Road Scrapers, Excavators, Trucks & Wheelbarrows OF ALL KINDS.

THE "COLUMBUS" ROAD SCRAPER

is pressed from *one solid sheet of heavy steel*, and is the strongest and most durable Road Scraper made.

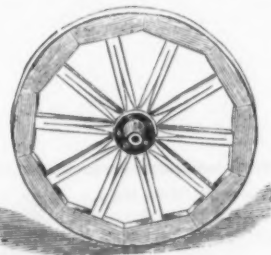
Used in making railroad embankments, excavating for canals, ditching, &c. The largest contractors in the United States have used them exclusively for years.



THE "COLUMBUS" SOLID STEEL ROAD SCRAPER.

JACOBS' PATENT WHEELS.

The Strongest and Lightest Running Wheel known.



It will not Shrink in any Climate. The Tire Cannot Come Off.

It has TEN spokes of thoroughly seasoned wood, and each spoke is supplied with a separate felloe. The hub is of chill cast iron, and riveted firmly to the spokes, which are so cut as to counterbrace each other. The spokes are keyed from the center after the tire is shrunk on. *This wheel will not shrink or give in any weather or climate, and the tire cannot become loosened.* An oil hole is drilled into the hollow washer of the hub, and the oil distributes itself along the bearings while the wheel is in motion. The wheel revolves on a fixed shaft or axle, which passes through the end of the handle, and is a brace to the barrow. This wheel cannot be broken or weakened by ordinary usage, and will last a lifetime. It is well painted. *We guarantee it superior to any other WOOD WHEEL.*

JACOBS' PATENT STEEL SPOKE WHEELS.



Wheel Complete.

Wrought-Iron Tire
Steel Spokes.



Without Hub—Showing Construction.

These wheels are so constructed—having spokes tightened from center—that the tire cannot come off or the spokes become loosened. Hubs hardened on inside. Oil hole in hub. Diameter of wheel, 17 inches. Wrought-iron tire, 1½ inches wide. *Steel spokes. The Best Barrow Wheel Manufactured.*



The above cut shows the manner in which our *Railroad, Ore, Wharf and Steel Tray Barrows* are packed for shipment. This insures lowest rate of freight, and they can be quickly and easily set up by following the simple instructions sent with each half-dozen Barrows. In this shape Barrows require much less room for storage, and can be as easily set up as if received with Tray fastened to Frame.

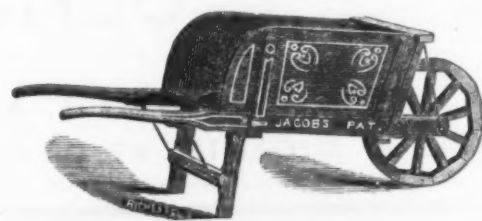


"COLUMBUS" STEEL TRAY WHEELBARROWS.

The Tray is stamped from *one solid plate of steel*. Steel Spoke Wheels 17 inches in diameter. Wrought-Iron Tire, 1½ inches wide. These Barrows, while much lighter than those having iron frames, are *equally strong* for all practical purposes, and will stand the roughest usage. Two sizes. No. 1, capacity 3½ cubic feet, for Earth, Sand, Ore and Foundry use. No. 2, capacity 5 cubic feet, for Coal, Manure, Sawdust, Ashes, &c. Pack for shipment same as R. R. Barrow.

We make three sizes of these Scrapers. No. 1, capacity, 7 cubic feet of earth. No. 2, 5 cubic feet of earth. No. 3, 3½ cubic feet of earth. Furnished with or without *solid steel shoes or runners*, as desired.

The bails are of refined iron, with strong and perfect working swivels. Bowls nest and handles crate compactly for shipment.



GARDEN OR FARM BARROW.

Set Up.

Double Frames and so constructed that by simply removing one bolt (the axle) and two nuts they can be folded flat down (see cut) and shipped at lowest rate of freight. Three sizes.



Folded for Shipping.



STRAIGHT HANDLE STONE BARROW.

With Jacobs' Patent Wheel. Strong, well-made, iron strapped over bottom and bolted together. For stone or pig iron, &c.



BENT HANDLE STONE BARROW.

With Jacobs' Patent Wheel. 17¼-inch tire. Well ironed and bolted. Extra strong.



STEEL BOTTOM STONE BARROW.

Bottom and Dash formed of *one plate of steel one-fourth of an inch thick*. Steel Spoke Wheel. The strongest and best Stone Barrow manufactured. Very durable.



THE AUTOMATIC REVOLVING ROAD SCRAPER.

Three sizes. 30, 33 and 36 inch. Both Steel and Wooden Bottom.



RAILROAD OR CANAL BARROW.

With Jacobs' Patent Wood Wheel. Bent Tray, full sized, planed and well finished.



RAILROAD OR CANAL BARROW.

Same as above, except with Jacobs' Patent Steel Spoke Wheel.



ORE OR MORTAR BARROW.

With Jacobs' Patent Wood Wheel. All hardwood. Bowl dovetailed together and firmly nailed.



OPEN BOTTOM BRICK BARROW.

With Jacobs' Patent Wood Wheel. Folds for shipping same as Garden or Farm Barrow.



TIGHT BOTTOM BRICK BARROW.

Same as above except having Closed Bottom. We furnish either style of these Barrows with *Steel Spoke Wheel* when specially ordered.



WOOD OR BARK BARROW.

Wheel same as above. Body and Dash strapped with heavy iron. Well finished. For Wood, Bark, Bales, Boxes, &c.

ILLUSTRATED CATALOGUE AND PRICES FURNISHED ON APPLICATION.

electric main into the charging sockets of the battery, and to leave it there from the time the lamp is handed in at the end of a shift until it is wanted again, 12 or 14 hours after. Hundreds of lamps can be charged at a time in this way, and at very small cost. An engine developing an effective 5-horsepower, and a dynamo electric machine correspondingly small, would suffice to charge 300 lamps at one operation.

The Distribution and Proportions of American Blast Furnaces.*

BY JOHN BIRKINBINE, PHILADELPHIA, PA.

(Concluded from page 7, December 24, 1885.)

The following tables will indicate the number, the variations in size and what might be considered an average size for the furnaces using the different fuels in most of the States and in the whole country. The census statistics for the Iron and Steel Association for 1880 exhibit, by a series of maps, the location of iron manufactures and production, and give at a glance the general position and the relative importance as to the amount of output of various sections of the country. Taking the blast furnaces, I find that in most cases convenience of supplies, ore, flux and fuel or the carrying of their product have been the guiding causes in determining the location, and, generally speaking, the existence of iron ores in the immediate vicinity has predominated in selecting the location of the blast furnaces, particularly those of the older plants, but in many cases the works have been placed far from their ore supplies, and more convenient to fuel or market.

In the former class, viz., those located close to ore supplies and distant from sources of fuel, may be mentioned, practically, all of the blast furnaces using mineral fuel in the New England States and in New York. The furnaces at Pittsburgh and in Western Pennsylvania generally have cheap fuel convenient; some have a partial supply of local ores, but most of them obtain their ore supply from distant points. In Eastern Pennsylvania, Southwest Virginia, Colorado, Tennessee and Alabama fuel and ores both abundant, and the furnaces may be classed as occupying middle ground as to transportation facilities.

The furnaces about the larger cities of New York, Pennsylvania, Ohio, Illinois and Missouri have mainly the convenience of market and competitive transportation of stock for a basis of location. Some of them possess certain advantages as to reception of raw materials, but their position must be considered as available chiefly on account of the market and railroad features. In general terms we might say that heretofore the furnaces located for a market for their product have been less successful than those placed nearer ores or nearer fuel; but some new plants, situated at good market centers, to which ores, fuel and flux must be carried long distances, appear to produce most satisfactory results.

The charcoal furnaces of the United States are mostly placed close to or within cheap transportation of ore supplies, and the accessibility of sufficient fuel is also considered in selecting a site. Some of the charcoal furnaces, such as those in Michigan, Wisconsin and Washington Territory, have to transport their ores to locations where fuel is abundant, but, with few exceptions, the location of the charcoal furnaces may be considered as being placed close to their ore and fuel supplies, practically independent of market conveniences, and often of transportation facilities. The charcoal furnaces about Baltimore are favored with cheap fuel, on account of having water transportation from extensive areas of timber. They are convenient to market, but suffer on account of costly ores. As a rule we have not been as careful as circumstances warrant in selecting locations for blast furnaces, and our iron-producing industry probably suffers fully as much from bad location as it does from inferior construction or from want of good management. There are a few active blast furnaces which have been apparently injudiciously located, for which an excuse can be found in their connection with some other business enterprise, such as the development of a large tract of land owned by the parties operating the furnace; but generally the plants which are defective in location are idle, and those in blast now are favored either by excellent management, modern equipment or superior location.

The annexed table, compiled from the Directory of the American Iron and Steel Association, has been prepared to illustrate the range, dimensions and capacities of furnaces in various parts of the country using the different fuels. The table is arranged, first, in the order of the kind of fuel used, three classes only being recognized, namely, those using anthracite coal, or anthracite mixed with coke; those using bituminous fuel, embracing furnaces depending upon coke, raw bituminous coal, or raw coal mixed with coke; and furnaces which are operated by charcoal. The table represents the maximum and minimum diameters of bosh and the maximum and minimum height of furnaces at the time it was prepared. In connection with the maxima and minima, average dimensions are presented, not as being absolute, but merely as indicating in a general way the preponderance of size. The maximum height and maximum diameter, or minimum height and minimum diameter, are not necessarily associated with one furnace, but the calculation has been made as also one to show the average capacity, merely with the view of illustrating at a glance the general proportions of the furnaces in each district or State.

Total number of stacks in the United States:

| | |
|--------------------------|-----|
| Anthracite..... | 221 |
| Coke and bituminous..... | 221 |
| Charcoal..... | 224 |
| Total..... | 666 |

These tables show two anthracite, one bituminous and four charcoal furnaces more than the annual report of the American Iron and Steel Association, owing to the fact

* Read at the Halifax meeting of the American Institute of Mining Engineers.

that the Directory and report are not contemporaneous by a few months.

Aggregate annual capacity of same:

| | |
|--------------------------|-----------|
| Anthracite..... | Net tons. |
| Coke and bituminous..... | 3,074,082 |
| Charcoal..... | 5,067,100 |
| Total..... | 8,141,182 |

Maximum height of furnaces, 86 feet; minimum height of furnaces, 17 feet. Maximum bosh diameter of furnaces, 21 feet; minimum bosh diameter of furnaces, 6 feet. Average capacity of all furnaces in the United States, 14,011 net tons annually.

The difference between the capacities and the output of our blast furnaces is often misunderstood by those who discuss iron

many charcoal furnaces still pursue of blowing out early in each year when the stock of charcoal is exhausted. As in most parts of the country where charcoal pig iron is produced charcoal cannot be made in meliers before May, a large proportion of the furnaces are idle when the April returns are collected. To more fully understand the proportion of active and idle furnaces, the accompanying table has been prepared, showing the percentage of the blast furnaces of the United States, arranged according to the fuel used, which were active at the dates named. The reports from the two authorities are placed in parallel columns, and wherever the data have been approximately contemporaneous they are on the

show 68.1 per cent. of the charcoal furnaces in operation, and those for April, 1877, exhibit but 20.2 per cent. in blast.

This analysis may surprise some, for few will surmise that in the past 12 years there have at no time been two-thirds of all the blast furnaces in the country in operation;

cause many reported out of blast are handicapped by situation, size, equipment or supplies, and go out of blast at times when more fortunate plants can operate successfully. There are, however, always a considerable number of blast furnaces being repaired or rebuilt: scaffolds, fires, chills, explosions,

PERCENTAGES OF WHOLE NUMBER OF BLAST FURNACES WHICH WERE IN BLAST AT VARIOUS DATES.

| Year. | Date. | From Iron Age quarterly returns. | | | | From annual reports of the American Iron and Steel Association. | | | |
|-------|------------------|----------------------------------|-------------|-------------|---------------|---|-------------|-------------|---------------|
| | | Charcoal. | Anthracite. | Bituminous. | All furnaces. | Charcoal. | Anthracite. | Bituminous. | All furnaces. |
| 1873 | December 31..... | 68.1 | 66.1 | 48.5 | 62.4 | 51.8 | 60.3 | 44.7 | 52.6 |
| 1874 | December 31..... | 51.8 | 60.3 | 44.7 | 52.6 | 33.8 | 44.1 | 47.3 | 41.09 |
| 1875 | December 31..... | 24.5 | 31.1 | 36.3 | 30.0 | | | | |
| 1876 | September 1..... | 25.6 | 39.0 | 40.5 | 34.1 | 26.0 | 37.2 | 37.8 | 33.0 |
| 1877 | April 1..... | 20.2 | 36.6 | 38.5 | 30.7 | | | | |
| | July 1..... | 32.2 | 38.4 | 40.8 | 36.7 | | | | |
| | October 1..... | 32.2 | 38.0 | 36.3 | 35.0 | | | | |
| 1878 | January 1..... | 29.1 | 43.3 | 39.4 | 36.7 | 29.0 | 44.5 | 41.3 | 37.7 |
| | April 1..... | 22.2 | 42.9 | 43.7 | 35.3 | | | | |
| | July 1..... | 23.8 | 42.2 | 41.0 | 34.8 | | | | |
| | October 1..... | 30.5 | 30.4 | 37.5 | 33.4 | | | | |
| 1879 | January 1..... | 29.9 | 41.7 | 40.0 | 36.7 | 33.0 | 42.3 | 40.3 | 38.2 |
| | April 1..... | 25.7 | 38.6 | 38.3 | 33.8 | | | | |
| | July 1..... | 31.1 | 43.9 | 47.0 | 40.0 | | | | |
| | October 1..... | 37.4 | 55.6 | 58.4 | 48.7 | | | | |
| 1880 | January 1..... | 38.4 | 70.8 | 61.1 | 56.3 | 38.7 | 70.7 | 60.8 | 55.6 |
| | April 1..... | 29.2 | 82.1 | 67.9 | 61.9 | | | | |
| | July 1..... | 48.5 | 70.1 | 51.3 | 56.4 | | | | |
| | October 1..... | 56.0 | 59.8 | 58.4 | 58.0 | | | | |
| 1881 | January 1..... | 58.1 | 68.0 | 68.9 | 63.7 | 57.6 | 68.5 | 65.7 | 63.6 |
| | April 1..... | 50.5 | 66.5 | 70.7 | 61.8 | | | | |
| | July 1..... | 53.2 | 61.8 | 65.1 | 59.6 | | | | |
| | October 1..... | 55.4 | 62.9 | 60.6 | 59.4 | | | | |
| 1882 | January 1..... | 56.1 | 71.6 | 64.5 | 63.6 | 55.1 | 71.7 | 65.7 | 63.5 |
| | April 1..... | 57.8 | 74.1 | 66.9 | 61.5 | | | | |
| | July 1..... | 53.7 | 69.4 | 52.1 | 58.2 | | | | |
| | October 1..... | 61.9 | 68.5 | 53.5 | 61.2 | | | | |
| 1883 | January 1..... | 48.2 | 72.5 | 60.8 | 60.1 | 51.1 | 71.5 | 60.4 | 60.7 |
| | April 1..... | 38.4 | 66.6 | 53.7 | 52.5 | | | | |
| | July 1..... | 43.7 | 53.6 | 48.0 | 48.3 | | | | |
| | October 1..... | 41.1 | 52.5 | 50.6 | 47.8 | | | | |
| 1884 | January 1..... | 31.0 | 47.1 | 44.4 | 40.6 | 35.0 | 52.1 | 47.6 | 44.9 |
| | April 1..... | 24.7 | 40.3 | 44.0 | 37.9 | | | | |
| | July 1..... | 31.8 | 43.7 | 43.3 | 39.4 | | | | |
| | October 1..... | 29.5 | 37.9 | 35.1 | 34.1 | | | | |
| 1885 | January 1..... | 29.4 | 38.2 | 36.6 | 34.7 | 28.7 | 38.4 | 39.1 | 35.3 |
| | April 1..... | 20.7 | 36.7 | 40.4 | 32.4 | | | | |
| | July 1..... | 21.4 | 36.5 | 41.1 | 32.8 | | | | |
| | October 1..... | 27.0 | 34.2 | 39.3 | 33.5 | | | | |

Minima in italics, maxima in full-faced figures.

BLAST-FURNACE CAPACITY, FROM "IRON AGE" QUARTERLY REPORTS.

| Year. | Date. | Capacity of charcoal furnaces in blast, Tons. | Capacity of anthracite furnaces in blast, Tons. | Capacity of bituminous furnaces in blast, Tons. |
|-------|-----------------------|---|---|---|
| 1877 | January..... | 6,330 | 16,460 | 21,660 |
| | April..... | 5,025 | 18,240 | 10,875 |
| | July..... | 7,730 | 17,442 | 20,660 |
| | October..... | 7,887 | 17,067 | 19,671 |
| | Average per week..... | 6,743 | 17,302½ | 20,466¼ |
| 1878 | January..... | 6,624 | 21,040 | 22,923 |
| | April..... | 5,001 | 19,410 | 23,644 |
| | July..... | 5,420 | 19,315 | 21,735 |
| | October..... | 7,079 | 17,660 | 18,360 |
| | Average per week..... | 6,031 | 19,356¼ | 21,915½ |
| 1879 | January..... | 6,623 | 20,669 | 23,326 |
| | April..... | 6,256 | 19,064 | 25,263 |
| | July..... | 7,420 | 21,032 | 28,458 |
| | October..... | 9,119 | 29,399 | 32,873 |
| | Average per week..... | 7,354½ | 22,763½ | 27,440 |
| 1880 | January..... | 9,013 | 35,267 | 37,342 |
| | April..... | 8,842 | 40,096 | 39,472 |
| | July..... | 11,875 | 36,189 | 33,156 |
| | October..... | 13,988 | 29,851 | 35,790 |
| | Average per week..... | 10,929½ | 35,350¼ | 36,440 |
| 1881 | January..... | 14,708 | 34,845 | 45,438 |
| | April..... | 13,505 | 35,089 | 48,410 |
| | July..... | 14,596 | 33,313 | 48,796 |
| | October..... | 15,009 | 33,224 | 45,515 |
| | Average per week..... | 14,454½ | 34,117¼ | 47,039¼ |
| 1882 | January..... | 15,186 | 38,108 | 48,658 |
| | April..... | 13,596 | 38,566 | 52,027 |
| | July..... | 15,875 | 36,715 | 49,431 |
| | October..... | 16,455 | 36,878 | 43,723 |
| | Average per week..... | 15,277¼ | 37,566¼ | 46,209¼ |
| 1883 | January..... | 13,700 | 39,340 | 53,144 |
| | April..... | 11,032 | 37,216 | 48,201 |
| | July..... | 12,413 | 39,109 | 49,966 |
| | October..... | 10,686 | 29,969 | 50,452 |
| | Average per week..... | 11,957¼ | 34,158½ | 50,440¼ |
| 1884 | January..... | 8,936 | 28,824 | 45,365 |
| | April..... | 8,714 | 27,612 | 49,236 |
| | July..... | 10,280 | 26,949 | 47,630 |
| | October..... | 8,669 | 23,539 | 40,410 |
| | Average per week..... | 9,149½ | 26,731 | 45,660¼ |
| 1885 | January..... | 8,371 | 21,564 | 36,812 |
| | April..... | 7,481 | 21,704 | 45,655 |
| | July..... | 7,692 | 20,444 | 43,943 |
| | October..... | 8,056 | 20,318 | 43,234 |
| | Average per week..... | 7,900 | 21,007½ | 42,411 |

same horizontal line. Wherever blank spaces are left there were no reports made at the time noted.

The foregoing statement shows the estimated output of the furnaces of the several classes at dates corresponding with those given in the tables which were published in *The Iron Age*. While the total quantities have corresponded remarkably with the full returns published by the American Steel and Iron Association, there has been a divergence where the outputs of the various kinds of pig iron are considered, and the quantity credited to the charcoal blast furnaces is somewhat in excess of what was actually produced by them.

From these tables we learn that at no time since 1873 have over 63.7 per cent. of all the furnaces in the country been reported as in blast, and the proportion of active furnaces has been as low as 30 per cent. of the whole. The largest percentage of active furnaces returned was 82.1, as shown by the record of anthracite furnaces in April, 1880, and the least proportion of anthracite furnaces in blast was 31.1 per cent., in September, 1876. The bituminous furnaces show less variation than those using anthracite fuel, the maximum percentage of the bituminous furnaces being 70.7, in April, 1881, and the minimum 36.3, in September, 1876. The returns for December 31, 1873,

that the average proportion of active furnaces has been greater in those using anthracite than in those employing bituminous fuel or charcoal, and that, except in the years 1873 and 1874, and from October, 1880, to October, 1882, less than one-half of the charcoal furnaces have been reported in operation at one time. The difficulty of obtaining reports from some charcoal furnaces may partially account for the latter statement. To estimate the aggregate furnace capacity of the country it would not be proper to divide the output of our blast furnaces in any one year by the average percentage of active furnaces in that year, be-

cause many reported out of blast are handicapped by situation, size, equipment or supplies, and go out of blast at times when more fortunate plants can operate successfully. There are, however, always a considerable number of blast furnaces being repaired or rebuilt: scaffolds, fires, chills, explosions,

bad management, scarcity of fuel or ores, financial troubles and other causes are constantly occurring to withdraw furnaces from the active list, so that it is doubtful if, under especially favorable circumstances, the country could produce 75 per cent. of the total blast furnace capacity in any year. The percentages above given show that the average activity is scarcely 50 per cent. of the total number of blast furnaces.

The character of blast-furnace structures cannot in the limits of this paper be discussed; but the variety is great, embracing both the crudest designs and the triumphs of modern engineering. Furnaces are to-day

considered on the active list which consist of stone stacks lined with shale and sandstone, blown with cold blast through one open tuyere, the blast being supplied from wooden blowing-tubs connected with a water-wheel, their product averaging from 4 to 6 tons per day. Modern plants, making over 300 tons per day, with equipment of powerful steam blowing machinery, hot blast stoves, &c., furnish the other extreme, and between these two are the large majority of American blast furnaces. Fully 75 charcoal blast furnaces employ cold blast, and the number of furnaces which are operated with open tops exceeds 100. Although modern practice has been in favor of stacks formed of iron shells supported on columns, nearly one-half of the stacks herein enumerated are in whole or in part stone or brick structures, and one-fourth are what is known as "bank furnaces"—that is, they are placed against a hillside, so as to receive the stock at or near tunnel-head level. The remodeling of old plants and additions to equipment have caused many furnaces to occupy debatable ground as to character of structure, but without considering the details of arrangement the above summary will be found close to the facts as they exist at this date. Reconstructions or new plants will continue to decrease the proportion of older arrangements, but many will continue, by reason of local surroundings, to be ranked as named.

MECHANICAL.

A Unique Locomotive Feed-Water Heater.

A unique locomotive feed-water heater, devised some years ago by Mr. Henry Schlacks, superintendent of motive-power of the Illinois Central Railroad, is thus described in the *National Car-Builder*: Attempting to utilize for steam-making a portion of the heat that passes through the smoke-box and smoke-stack of the locomotive, Mr. Schlacks made a stack with a lining that provided a hollow chamber to hold water, and the upper portion of smoke-box was also made with a water chamber that was in communication with the stack chamber. The cold water was pumped into the stack chamber, and from thence was conveyed by proper means to the boiler. The thing worked all right for a few weeks, and effected considerable saving of heat, for the feed-water was raised to about the boiling point before it passed into the boiler. One day, when the engine was in the house, Mr. Schlacks was looking at the heater, when he saw a drop of reddish water leak from under the smoke-stack base, and run down the smoke-box. On examining closely, he observed that the drop cut a tiny furrow on the iron it ran over, and he decided that a probable bad cause of corrosion was present; so that day he had the delivery pipes from the pump and injector so arranged that water could be put into the boiler direct. He also made provision for shutting off communication between the heater and the boiler by stop-cocks. The precautions were not taken any too soon, for on the next trip the heater developed a bad leak. Mr. Schlacks collected some of the powder left by the corrosive agent, and took it to a chemist for analysis. This gentleman interested himself in the case and made some investigations. He concluded that the comparatively cold surface of the heater acted as a condenser on the steam and sulphurous gases passing from the fire, and that a reaction took place, producing small quantities of sulphuric acid, which attacked the iron plates. On figuring up the cost of construction and maintenance of heaters made in this way, and the saving to be derived from their use, Mr. Schlacks concluded the invention would not pay, so it was abandoned.

Hodgson's Eccentric Mandrel for Locomotive Eccentrics.

We show in the two annexed cuts what is known as Hodgson's mandrel for quickly and cheaply turning up locomotive eccentrics and other eccentric work of a similar kind. It consists of a face-plate, A, bolted directly to the face-plate of the lathe, an expanding mandrel working in a slide, and a center, D₁, sliding in a direction opposite to that in which the mandrel is moved. This center takes a bearing on the dead center of the lathe. Fig. 1 shows the mandrel in position, with eccentric E ready for

This block is held in place by the nut B₁. When the nut B₁ on the screw B is slackened up, the mandrel C₁ can be moved to and from the center by putting the handle A₁ on to the screw A₁. A scale is marked off on A₁, the divisions being half-inches instead of inches, so that the throw of the eccentric is laid off from the drawing directly, without the liability to mistakes. The mandrel carries four wedges, C₂, which work in grooves with inclined bottoms. These wedges are all dovetailed into the ring C₁. As this ring is run in or out, the wedges, of course, are moved in and out correspondingly. The nut B₁, working on the screw B, controls their motion. The block D is put on the

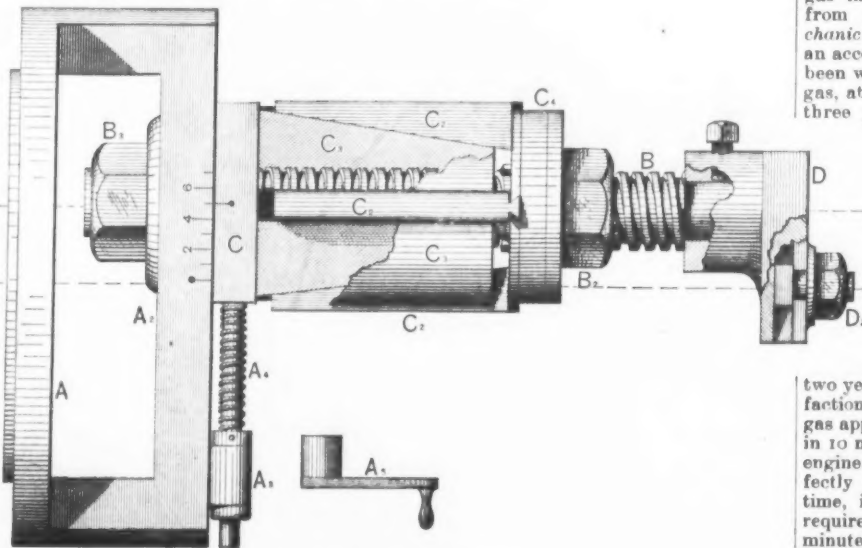
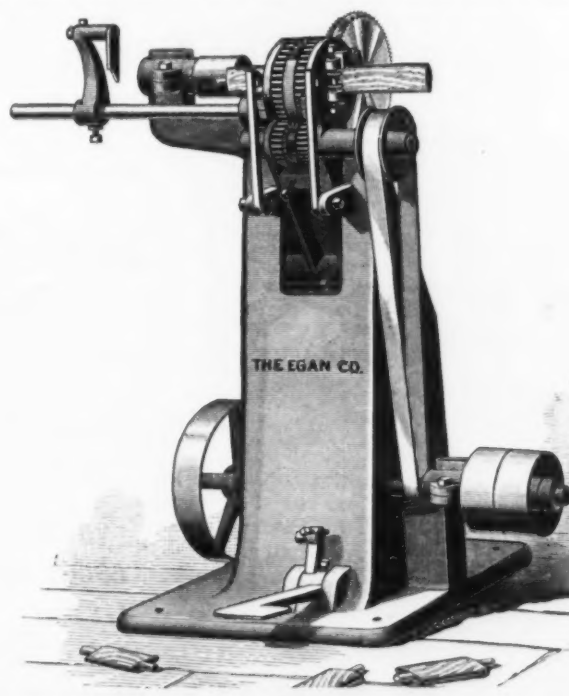


Fig. 2.—Details of Construction.

head of the screw to carry the sliding center D₁, and thus support the mandrel at the outer end. The center is formed on an ordinary 1-headed screw with a cup end. This block comes off when a piece of work is to be put in place. The whole rig is not only simple, but has been found exceedingly convenient, and has been used for a long time. The Baltimore and Ohio Railroad use the

Blind-Slat Tenoner.

Many new points of advantage are claimed by the Egan Company, of Cincinnati, Ohio, for their new blind-slat tenoner, a general view of which is presented in the annexed cut. The frame of this machine is a pedestal well designed and cored out, making it stiff and durable. The frame is cut on one side so that no dust nor chips are



Blind-Slat Tenoner, Manufactured by the Egan Company, Cincinnati.

liable to lodge in it. Jaws are so arranged as to be instantly adjusted on both sides by one screw having a right and left hand thread. By this means speed and accuracy are combined, and the manufacturers claim that the jaws can be set much quicker and much more accurately than by any other method in use. The treadle is convenient to the operator, and slightly pressing with the foot brings the head with its slat forward. One revolution is made when a stop is struck. A complete blind slat with tenon on two ends is made by a single revolution. In length a slat can be cut on this machine from 1 inch up, as required. The gauge will admit of any length, and the stops can be instantly changed so as to gauge accurately wherever required. A special feature to which the makers direct attention in this machine is that when the treadle is released from the foot the feed belt is loose, and when the foot is on the treadle the feed belt is tight. The makers recommend this tool for use in planing mills, car shops and in all other places where good and rapid work is required. They claim that with it a boy can do work more rapidly and more accurately than an expert on machines ordinarily employed.

Liquid Fuel in the British Navy.
Experiments with liquid fuel still receive a good deal of attention abroad. A trial is now being made at Portsmouth, England, with the object of determining the practicability of applying it in connection with the boilers of men-of-war. Several systems have already been tried, but the difficulties which presented themselves in the shape of smoke and irregularities of combustion were found fatal objections. The present system under trial is one submitted by Colonel Sadler, of Middlesboro', and is understood to have been previously tested with satisfactory results by private companies in Portsmouth and elsewhere. The fuel consists of creosote, which is procurable at a cost of about 2 cents a gallon. It is contained in a tank, and is kept at a uniform temperature and consistency by steam coils inside the tank, from which it is forced into the furnace by means of steam injectors. The present experiment is confined to comparing

the respective values of a pound of coal and a pound of the liquid fuel as evaporators of water. A man-of-war can carry only a limited weight of fuel, so that a comparative test of the weight of the two fuels is the most practicable that could be applied. So far the system, we understand, has proved superior to others previously tried.

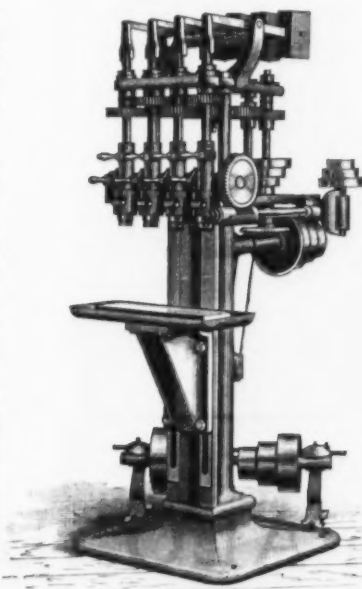
Gasoline Gas and the Otto Gas Engine.

Probably many who have erected or contemplated the erection of a small power plant for which a gas engine seemed specially applicable have encountered difficulties in the matter of gas supply and have perhaps made unsuccessful attempts to press gasoline gas into service. To such the following from a correspondent of the *English Mechanic* will prove interesting: "I send you an account of an Otto gas engine which has been worked for three years with gasoline gas, at a cost of about £6 per year. Some three years since I bought a 1-horse Otto gas engine. I also purchased of Mr. F. W. Clark, of London, one of his patent gasoline gas apparatus, on condition that if it would not drive the engine it was to be returned.

"The engine did not at first work quite satisfactorily, but I felt convinced that it could be made to do so. I concluded to keep the gas apparatus, and I then began to experiment with the engine, and for upward of two years it has worked to my entire satisfaction. In summer time I can light the gas apparatus and have the engine running in 10 minutes, and in one minute can stop engine and gas apparatus, leaving both perfectly safe till again required. In winter time, in very cold weather, more time is required to get the apparatus hot—about 20 minutes. The secret is this: Heat your cylinder and your gas and you will have no further trouble. I have two copper boxes (through which the gas passes to cylinder and slide lights) fixed on the top of the retort, and the waste heat from making the gas is sufficient for this purpose. I also heat the water in the jacket of cylinder to about 100° by having a Fletcher's gas bath-heating apparatus between cold-water supply tank and cylinder, so that I can shut off the cold water when necessary. If any of your readers will do the same they will have no difficulty in working the Otto gas engine with gasoline gas."

A New Drill Press.

Messrs. E. E. Garvin & Co., 143 Centre street, New York, are making something new in the drill press line, which we here illustrate. The four spindles driven with gearing have each an independent automatic feed and adjustable trip. They are counter-balanced by levers shown at the top of the machine, so that when the feed pinion is out of clutch the spindle can be raised or lowered by the direct movement of the handle fastened to the shell which forms the lever



New Drill Press.

bearing of the spindle. The trip mechanism is a wedge adjustable in a slot in the shell. Coming in contact with a projection upon the clutch-lever shown in the cut, it forces the pinion out of contact with a clutch-piece fastened to feed-shaft, leaving the spindle free. The table is vertically adjustable upon the face of column by the loosening of four bolts. The table has an oil groove communicating with an oil pump at the back of the column. The machine, with its counter-shaft, weighs 1200 pounds.

The Binghamton (N. Y.) Cable Road.

The new cable road at Binghamton, N. Y., possesses some novel and interesting features. It is a radical departure from the ordinary cable road. The new features of the system are that it dispenses with "grips" altogether. Two cables are used, one driven in the ordinary manner by a stationary engine. The other, a small cable resting upon the first and traveling with it over the same pulleys, is made to complete its endless circuit free from connection with the prime motor or engine. It is, however, made to move in unison with the main cable, and to receive a positive motion from it by passing around the same horizontal pulleys at the end of the road, and also by being led at suitable intervals between the sides of vertical conical rollers arranged in pairs. This secondary cable is led continuously over a loose drum or pulley fixed under the car. When this drum on the car is left free to rotate, the cable will run freely over it and the car will remain stationary. If, however, the pulley or drum be retarded in its revolution by a brake, so that it may no longer turn, the car will be carried forward with the cable. To stop the car the brake is lifted. There is said to be no jar or unpleasant motion in starting or stopping the car, and any number of cars can be run on the same line wholly independent of each

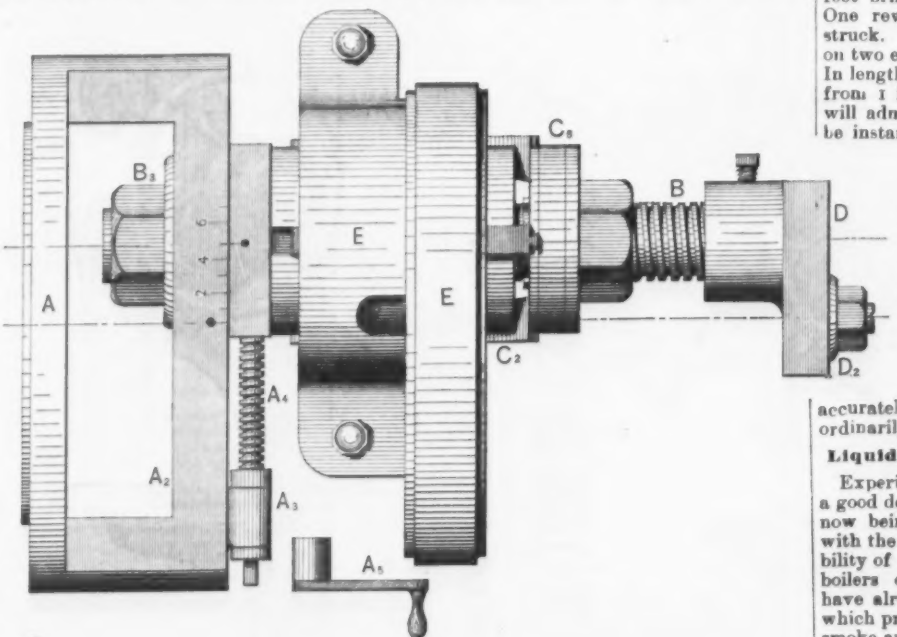
other. There is no switching at the ends of the road, as the track is laid in a circle, and the cars can make the curve and continue on the return trip without stopping. The slack of the secondary cable is taken up and its tension adjusted by means of tension rollers under the car. This system will require only a shallow subway below the surface of the track, as the secondary cable—the small one that imparts the motion to the car—comes up through the slot as the car passes, and drops back below the surface. With this system the cars can be run on single or double track and can make the curves and switches as readily as a horse car.

Recent Improvements in Gas Engines.

The recent London International Inventions Exhibition disclosed the fact that many minds have been engaged in the work of improving the gas engine, and Patent Office records show that within the past two or three years there has been quite a host of applicants for patents in connection with gas engines. The *English Mechanic*, in a recent issue, referring to English patents in this field, says:

Many of the applications refer only to modifications in details of well-known types, but others are radical departures from accepted practice. For instance, as agent for a foreign inventor, Mr. L. A. Groth patents improvements in gas or oil motors which consist in forcing a mixture of air and gas, by the motion of the working piston, quickly into a hot chamber until the mixture is ignited by the combined action of the compression and the heat of the walls of the chamber, the expansion resulting from the explosion—or, rather, sudden combustion—of the mixture being the driving power. The regulation of the ignition at the precise moment of the dead point is effected by a valve which admits more or less combustible matter, and by another which regulates the heat of the cylinder. Mr. P. M. Justice patents, as the agent of a foreign inventor, an automatic gas motor in which the igniter is rendered incandescent and explodes the mixture as soon as the velocity of the incoming gas is diminished. After the explosion a vacuum is formed which draws in a fresh charge of gas and air, and the parts having returned to their former positions, the charge is again ignited. Among the more novel and most recently completed devices is a compound gas engine, patented by H. P. Holt and F. W. Crossley, of Manchester, in which the passages for charging, igniting and exhausting are governed by the movements of what is called the high-pressure piston, without requiring the complication of a separate slide. It would be impossible to explain the arrangement of this engine without diagrams, and we must therefore refer those interested to Specification 15,311, 1884, for details. It must suffice to say that the invention appears to be an ingenious attempt to adapt the compound principle to gas engines by allowing the expanding gases in the smaller or high pressure cylinder to exhaust into the large or low-pressure cylinder, which process of exhaust induces the flow of a fresh supply of gas and air into the high-pressure cylinder.

Another novelty, patented by A. Davy, Sheffield, consists in the use of a steam generator in combination with a gas engine in order to effect economy by utilizing part of the heat of explosion in the gas chamber to convert water into steam. The explosion chamber is surrounded by the steam generator or water chamber, and a portion of the products of combustion are also exhausted into the generator and intimately mixed with the steam formed therein. The mixture of steam and products of combustion thus obtained is used for working the piston on its return stroke or for driving a piston of larger area in another cylinder—thus producing in two senses a compound engine. Another patent which seems to have some promise of success is that of E. J. C. Welch and R. C. Rapier, which refers to an engine of the type in which the gas is burned quietly and continuously under pressure, and the hot products are from time to time passed into the working cylinder, where they impart motion to the piston. The suction and delivery valves of the gas and air pumps are so constructed that when upon their seats the pump pistons can approach them so closely that clearance is reduced to a minimum, while in order to vary the amount of air and gas delivered by the pumps the suction or the delivery valves are caused to remain open for a certain proportion of the stroke of the pump piston when in the ordinary course of things they would be closed, or a direct communication may be made between the two ends of the pump, which is kept open during a variable part of the early portion of each stroke. The gas and air are delivered separately into the furnace of the combustion chamber. The burners consist of a tube closed at one end and open at the other, suitable openings being made in the closed end for the passage of the gas into the tube, and narrow slits or rows of holes are made lengthwise of the tube for the admission of air. The closed or gas-entrance end of the tube is fitted closely into a hole leading into the gas chambers, while the body of the burner extends through the air chamber and out into the combustion chamber, it being made air-tight where it passes out through the air chamber. When at work the gas enters through the end of the burner and mixes with more and more air as it passes along through the perforated tube until a point is reached at which it can commence to burn, and where carbonic oxide is first formed by the initial combustion. As more air becomes mixed with the carbonic oxide it is converted by further combustion into carbonic acid. In order to regulate and maintain a continuous combustion a quantity of broken pieces of fire-clay or other refractory material is placed above the burners. To reduce the temperature of the products of combustion they are mixed after combustion with an excess of air or a proportionate quantity of water, which is converted into steam. In starting the engine, gas is turned on from the main, and air is admitted through openings in the bottom of the furnace, so as to heat the broken fire clay and coils containing the water to be injected. The air and gas supplies and the



Hodgson's Mandrel for Turning Locomotive Eccentrics.—Fig. 1.—Mandrel in Position with Eccentric E Ready for Turning.

turning. The mandrel is set by the gauge on the bar A₁, and, as shown in cut, is ready to turn an eccentric with a throw of 5 inches.

Fig. 2 shows the details of the construction. The bar A₁ has a slot in which the block C and the mandrel C₁ slide in and out.

over, will last for years without repairs. It is made by the L. B. Flanders Machine Works, of Philadelphia, Pa.

Hoisting Machinery.

The Harrington Hand Elevator, for which Mr. J. Q. Maynard, of 12 Cortlandt street,

Buffalo ♦ Forge ♦ Company,

MANUFACTURERS OF

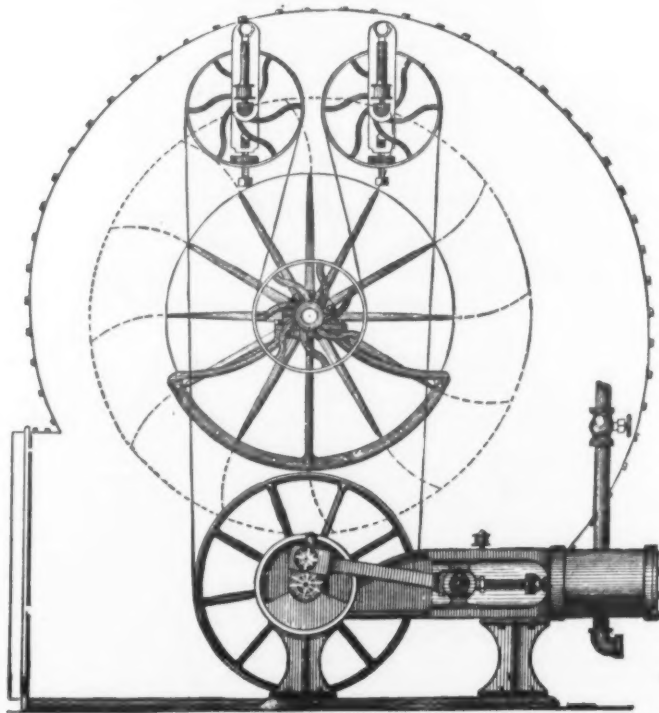
BLOWERS,

STEAM FANS

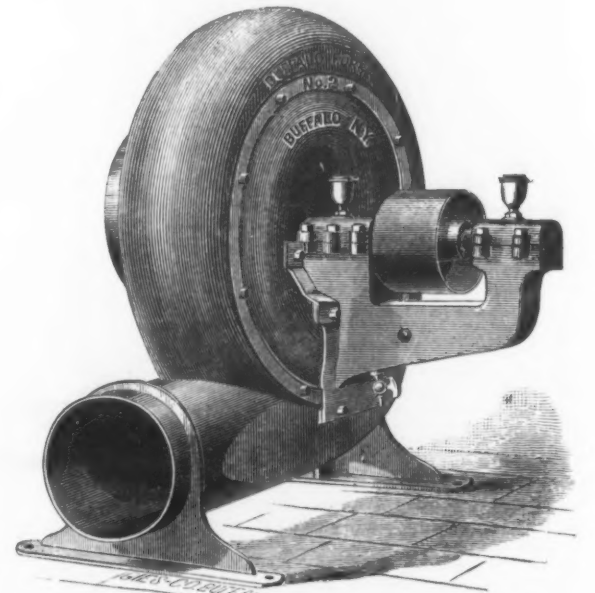
EXHAUSTING FANS,



For Cupolas, Forge Fires, Heating Furnaces,
Boilers, Puddling Furnaces, &c.



For Ventilating Hospitals, Mines, Public Buildings, &c.



For Planing Mills, Polishing Wheels, Buffing Lathes,
Ventilating Purposes of All Kinds.

Buffalo Portable Forges, Hand Blowers, Heating Forges, Annealing Furnaces, Stationary Forges, &c.

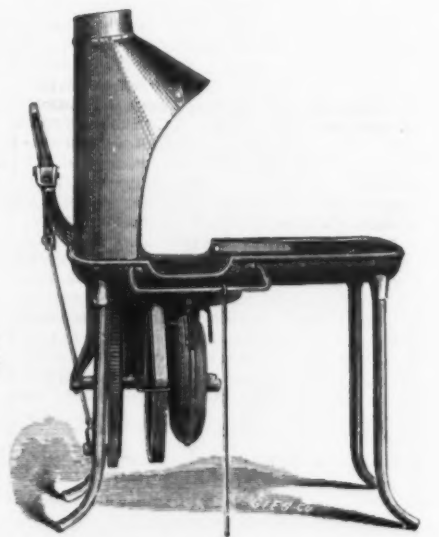


DOOR BUTTS,

CAST.

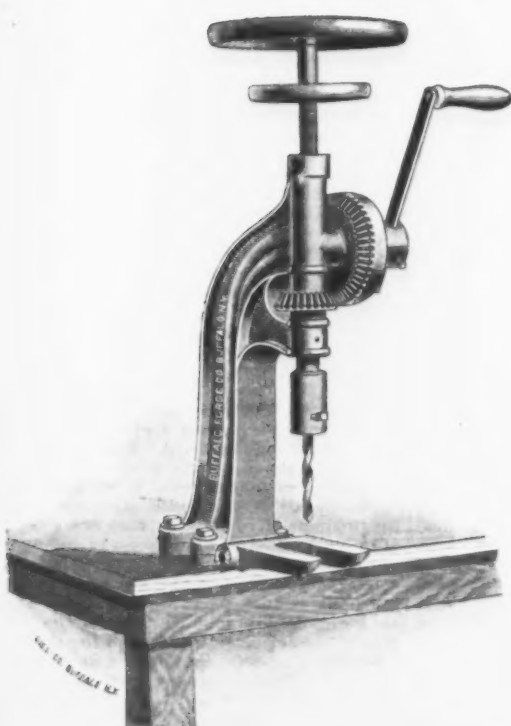
LOOSE PIN,
LOOSE JOINT.Plain
and Ornamental.New and Artistic
Designs.

WRITE FOR PRICES.

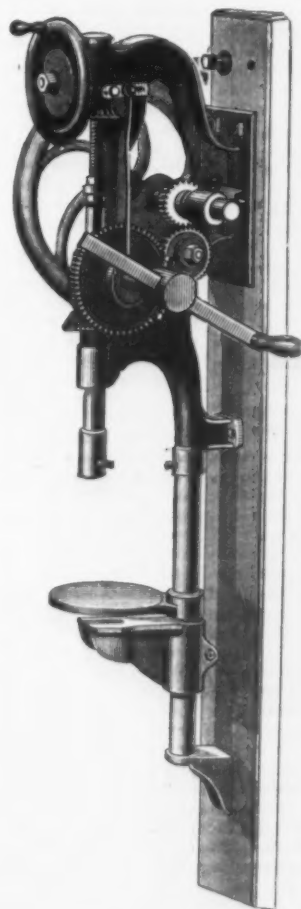
Buffalo Punch,
Shear
and Bar Cutter.Simple, Powerful
and Durable.SEND FOR CATA-
LOGUE AND PRICE
LIST.

BUFFALO BLACKSMITH DRILLS.

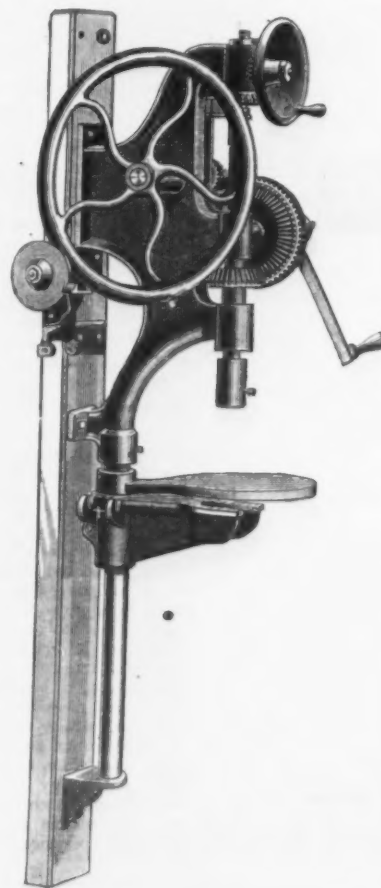
NEW IN DESIGN AND CONSTRUCTION, GIVING GREATLY INCREASED POWER.



Send for Catalogue and Price List.

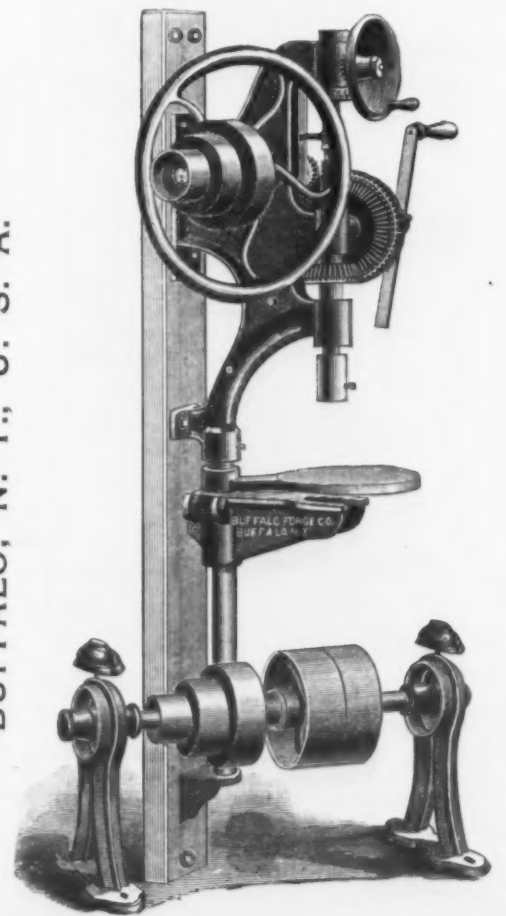


Best Selling Tools in the Market.



BUFFALO FORGE COMPANY,

BUFFALO, N. Y., U. S. A.



outlet from the furnace are then closed, and, water being admitted to the coil by turning the engine a few times or by a hand pump, sufficient pressure is generated in the combustion chamber to work the engine.

W. J. Hill, of York, patents a method of cooling the working cylinder by circulating air in passages around it, which air is subsequently used for admixture with the gas to produce the explosive mixture. E. Capitaine and O. Bruner, of Berlin, patent a novel form of engine which may rotate on a fixed crank-shaft, the crank being in a casing and the explosive mixture being conveyed to the cylinders through the hollow shaft. T. Parker, of Wolverhampton, patents a device in which there are three cylinders having pistons connected to the same crosshead. One is a working cylinder having a space beyond the stroke of the piston, forming a combustion chamber, into which the other pistons force air and gas from their respective cylinders. G. C. Douglas patents an improvement which consists in introducing air into the motor cylinder while combustion is taking place for the purpose of utilizing the latent heat of the dissociated gas to increase the efficiency of the engine. By adjusting the volume of air pumped into the working cylinder it is claimed that there is no necessity for cooling the cylinder with water and wasting useful heat. Any device which will prevent the enormous loss of heat, which is the greatest defect of gas engines, is a decided step in advance, and it is in that direction that real improvement is to be looked for. We have thus jotted down a few notes of devices which may or may not be improvements, but for each one that we have mentioned there are at least a dozen the novelty in which consists in modifications of the mechanical details. In this connection complication of valve gear seems to be a step in the wrong direction, while the device patented separately by H. P. Holt, in which the passages for charging, igniting and exhausting are governed by the movements of the piston without requiring a separate slide or moving valve, is an example of the kind of improvement which will probably be found most successful.

Rail-Washing Device.

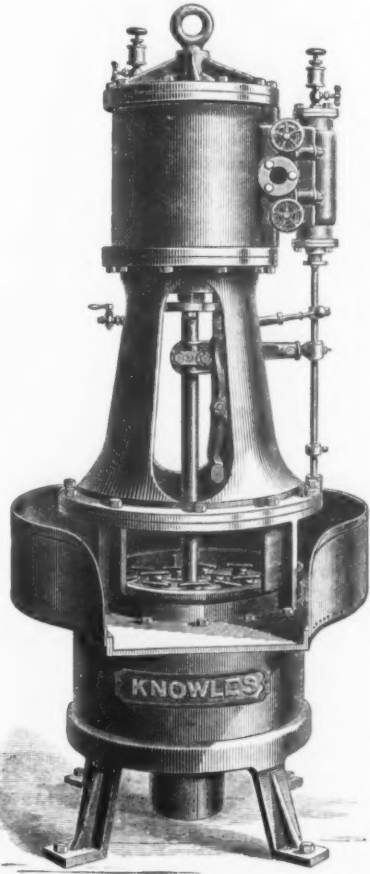
Concerning the frequently-mentioned hot-water apparatus for washing rails, we find it stated that the device is now in successful use in the Hauenstein Tunnel, on the Swiss Central Railway. The tunnel is about 1½ miles long and runs in a straight line, with a grade of 23.2 per 1000. The water issues at a high pressure. In the first instance a low pressure was tried, but the adhesion diminished instead of increasing, and high pressure was then adopted. A small ejector is placed upon the foot-plate; this is worked by steam from the boiler, which forces the water (drawn from the tender-tank) along a 1-inch pipe to the front of the engine. The pipe is then divided into two branches, which charge the water through orifices ½ inch in diameter, at a temperature of 140° F., and a velocity of 92 feet per second, at points about 2½ inches above the rails, a little in advance of the wheels. The consumption of water is stated to be about 11 gallons per minute. The rails are thoroughly cleansed, and the slipping of wheels, which was constantly occurring in this tunnel before the system was adopted, now very rarely takes place. Sand is seldom required and the wear of the rails and tires is greatly diminished. The company have fitted the apparatus to all the six-wheel coupled tender engines, which work both the passenger and goods trains through the tunnel. The engines are still fitted with sand-boxes, sand being used in the open.

Lead, Expansion and Compression in Steam Engines.

There are three different ways in which the work stored in the piston, piston-rod and connecting-rod of an engine can be utilized during the latter half of the stroke. Firstly, we may cut off steam very early in the stroke, and so permit the latter half of the stroke to be completed by the momentum of the reciprocating parts; secondly, we may cushion by closing the exhaust early, in which case useful work is done, because the steam compressed does duty instead of fresh steam from the boiler, and, thirdly, we may give lead and admit steam from the boiler, in which case useful work is done on it by slightly superheating it; but this is really the most wasteful way in which the work can be taken out of the reciprocating members of a steam engine, while the most economical consists in a happy combination of an early cut-off, by which the gross effective pressure falls below the resistance during the last half of the stroke, with cushioning. It has been shown that cushioning is one of the best possible means of securing economy; but it must not be forgotten that it is by no means easy to design an engine which shall combine in itself the conditions necessary to the adoption of the most favorable point of cut-off and of compression at one and the same time. Indeed, it is not too much to say that the investigation of this problem has up to the present fairly baffled every mathematician who has tackled it. It would be easy enough to do what is wanted if steam were a perfect gas, but it is not. Under the circumstances far more rough-and-ready ways of attaining the end most wanted, namely, the production of a good diagram and the elimination of shocks, has compelled engineers to resort to lead, and this cannot possibly be dispensed with to advantage in quick-running engines. In these last, unless there is a full pressure of steam in the piston at the beginning of the stroke, the crank has literally, and not by any figure of speech, to drag the piston away from the end of the cylinder, with, of course, jar and thump on the crank-pin. It is, however, utterly impossible to lay down any hard-and-fast rule concerning the amount of lead that ought to be given. It will vary not only for every engine, but with the conditions of pressure, &c., under which each engine is working. Noisy engines can be made to run silently and silent engines can be made noisy by the lead. Broadly speaking, the more lead the better; but it must not be forgotten that cushioning can be made to do duty that lead cannot. Any one can make a steam engine, but it requires a very skillful engineer to combine to the best advantage lead, expansion and cushioning.

Wrecking and Artesian Well Pumps

A number of new specialties in pumping machinery have recently been placed on the market by the Knowles Steam Pump Works, of 93 Liberty street, New York. Among these we direct attention to what is known as the Knowles wrecking pump, shown in Fig. 1 of our annexed engravings. This special vertical design is a very convenient and inexpensive form of pump for wrecking, drainage or irrigating purposes. These pumps are largely used by the wrecking



New Pumping Machinery Built by the Knowles Steam Pump Works, New York. Fig. 1.—Wrecking Pump.

companies of the seacoast and lake service; on the Lower Mississippi River they are used for draining bottom lands, &c. They are light, portable and have great pumping capacity. They are single-acting, but the flow of water from the pumps is practically constant, as the peculiar design and operation of pumps give this effect. They are claimed to handle large quantities of water with greater economy than centrifugal pumps, while they are much simpler and less likely to get out of order. They will not grind out and lose their suction power, causing excessive slippage, but, according to the builders, will fully discharge their correct theoretical capacity of water at any



Fig. 2.—Steam End of Artesian-Well Pump.

ders ranging from 6 to 18 inches in diameter and water cylinders from 12 to 33 inches.

Figs. 2 and 3 show an improved form of Knowles' vertical pump, specially designed for non-flowing artesian wells and for driven pipe wells where the water fails to rise within drafting distance—say 25 feet—of the surface. It will pump from the deepest wells—2000 feet if desired—and deliver a steady stream of water or oil to any point. The engravings show the steam end as it appears in position at the mouth of the well, and the working barrel, or pump end, located at the bottom. This latter is a casting of the hardest composition—not soft brass tubing—and is carefully bored out and fitted with pump-bucket and foot-valve. It is screwed on the lower end of the well-piping through which the pump-rod works. The pump-rod connection between the pump-bucket and the upper plunger is made of wood or extra heavy iron pipe. The action of the pump is fully controlled by a perfected arrangement of steam-valves, making the up and down strokes equally uniform and regular. The pump-bucket discharges water on the up stroke, and the upper plunger discharges on the down stroke; consequently, the flow of water is steady and continuous. The pump-bucket and foot-valve are of special construction, and can be readily drawn up through the well-piping for examination or repairs. The steam end is arranged to slide to one side upon the bed-plate, which feature is very convenient when it is necessary to pull out the pump-rod or take up the well-piping. The pumps are made with seven different sizes of steam cylinders—4 to 16 inches in diameter—and with 100 feet of piston travel the capacity varies from 30 to 288 gallons per minute.

English Letter.

(From Our Regular Correspondent.)
LONDON, DECEMBER 21, 1885.
THE END OF 1885

is now a proximate event, and as I write there is the usual bustle indicative of the approach of the Christmas holidays, which will begin on December 23 and extend more or less over the short balance of 1885. Business in many departments, especially in the lighter hardware branches and the fancy trades, is very brisk, but it is only a sort of dying splutter and will not in any way compensate for the depression of the year as a whole. Notwithstanding the long-continued dullness it is noticeable that there is a good deal of money in circulation, and it is argued that a large proportion of it is expended by the working classes. The upper and highest members of the body politic appear to be the most impecunious, and that circumstance is rightly taken to indicate that they have suffered and are still suffering most severely from the general depression of everything. As I have said on other occasions, indeed, labor has not felt the pinch of the hard times so seriously as capital. At the same time the turn of the workmen is coming. Reductions of wages are talked of on all sides, and in several branches of the iron trade notices have been given to the men with that end in view. In the Midland district the matter has been submitted to arbitration, while in the North of England the operative shipbuilders are actually stupid

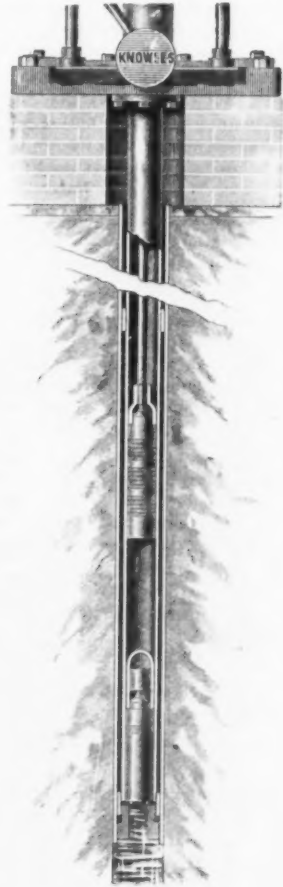


Fig. 3.—Working Barrel of Artesian-Well Pump.

speed—an impossibility with centrifugal and similar pumps. A full and comparatively long stroke, with an even, smooth motion on the up as well as on the down stroke, are special features of the Knowles pumps. The steam cylinder is positive and does not require any lever or other hand gear to work it "off the center." There are no belts to slip or complicated mechanism to get out of order. These pumps are simply lift pumps, and are not designed to elevate water above their discharge nozzles, but they will draw water any distance within the limit of suction power. The water cylinder is lined with brass; the valve-seats, &c., are also of brass. The piston rods are brass-covered, so that these pumps are adapted for salt as well as fresh water. Valves of best vulcanized rubber are used, with the largest area possible to pass obstructions. The pump is made in five sizes, with steam cylin-

der enough to pointblank decline to discuss the question at all. These men declare they will strike sooner than submit to a reduction of 10%, notwithstanding the stagnation which pervades the industry and the dearth of orders. The employers in all directions would much prefer to lengthen the hours of labor even in preference to reducing the rates of remuneration, but they seem afraid to undertake what would undoubtedly prove a most formidable task. British artisans have the shortest hours of labor of any workmen throughout the world, and they have become so wedded to the nine hours' system and the Saturday half-holiday that I believe the majority of them would starve sooner than concede another hour a day at the ordinary rates of payment. They do not mind making long hours if they are paid overtime—indeed, their chief notion is, in many trades, to so manipulate things as to throw as much

overtime in as possible and to let each day stand alone in that respect. Hard experience has not yet taught the men much, nor has education largely expanded their views.

You will doubtless notice that in the *Times*, the *Ironmonger* and other leading British journals discussions are in progress on the fair-trade question. Fair trade finds many advocates, while numerous correspondents appear to be dissatisfied with free trade, while being still unsatisfied as to the claims of its rival. As I have said in these columns times without number, fair trade has gained a strong hold in many parts of this country and there are thousands of persons who are mild believers in it, but dare not avow their views. At the same time the free traders are staunch as ever, and I do not see how the fair traders can expect to make headway until they put before the public an intelligent and intelligible legislative programme. They have not yet done, but I suppose something of the kind is in contemplation in view of the general election with which we are threatened next year, which struggle bids fair to be carried on two main platforms—Irish legislation and fair trade.

Considerable curiosity is being manifested as to the fate of the International Rail-makers' Association. The leading spirit of the combination, Mr. George Wilson, of Sheffield, is dead, and it is not very clear upon whom his mantle has fallen. At all events it is surmised that the German makers mean to break away from the association unless they are allowed to share in the Indian and Australian orders. Under the existing rules these are reserved to the English mills as being for the "home market," but the Germans say they are not properly so reserved, and say they ought to participate in the business. As a sign of the "rift within the lute," I may mention that the Victorian order for 40,000 tons of steel rails has been placed with Briscoe & Co., Australian merchants, London, at a price much below the official standard of the association. Messrs. Briscoe are not makers and will have to give the work out, and then get a profit on the transaction. It follows, therefore, that some of the rails may be made by the mills of the associated makers unless, indeed, the one concern in England not in the combination "takes the cake." Anyhow, there is a pretty good idea as to where the rails will be produced.

THE IRON MARKET

is again unaltered, and remains without special features to note. The near approach of the Christmas holidays and the end of the year is causing some little increase of activity at many of the works, but the open market is very quiet, and few new orders are likely to be placed until January. At Glasgow the market has been tolerably steady, and a moderate turnover has been effected in warrants, which closed at 42½ p. ton. Scotch makers' brands are virtually unchanged. Shipments are pretty well sustained, but the reserve stocks are still increasing at a rapid rate—so rapidly, indeed, that the statistical statement to be issued by the end of the month will in all probability be of a very unfavorable character. At Middlesboro' No. 3 is easy at about 32 p. ton for prompt and early deliveries. The business is only poor for local consumption, and the shipments are necessarily contracted at this season of the year. Nothing special has transpired as yet as to the continuance or augmentation of the restriction of the production. On the West Coast hematite pigs are steadily firm under the influence of a rather better home demand, coupled with American sales and inquiries for next year's deliveries. Mixed numbers in usual proportions are quoted at 45 p. ton, f.o.b. West Coast ports or free on rail. Elsewhere pig iron is quiet, and for the most part obtainable on terms which are favorable to buyers. In heavy manufactured iron there is a good turnover at such of the establishments as are devoted to the production of bridge, engineering and structural-iron work, although existing contracts are being run through rather faster than they are being replaced. Fencing wire is still dull and weak. In galvanized sheets business is tolerably large, but values are extremely irregular, and the best markets are overstocked by lots sent out on consignment. Ordinary finished iron is about as of late, in respect of the demand and prices, both of which are irregular. Moderate lots of Welsh bars are going to India. The bulk of the consumption at home appears to be of common and lower medium sorts of bars. Sheets are fairly steady all round. Old materials are firm, but not notably changed. Freight rates are steady, pig iron from Glasgow to New York by ordinary steamers being called 7/6 @ 10/ p. ton. The Australian freight "ring" is still the subject of much correspondence and dissatisfaction, especially in respect of the preferential rates alleged to be given by its members to goods from certain Continental ports. Steel is very quiet, and at many of the Sheffield works the usually busy period just prior to Christmas is this year one of the duller ever known. The Bessemer concerns are doing tolerably well on rolled material, and the Siemens works continue pretty well engaged. Steel rails are in rather better request, but values are nominally unchanged, on the basis of £4. 15/ for D. H., and £4. 17/6 for flange sorts.

SCOTCH PIG IRON

is quiet and without animation either in warrants or makers' iron. Prices are pretty well sustained considering the enormous stocks and the uncertainties of the future. There are 92 furnaces in blast, as against 93 a year ago. In Connal's stores there are 661,342 tons as compared with 579,293 tons this date last year. Shipments to date are 423,930 tons, or 90,093 tons less than in 1884, while importations of Middlesboro' have been 362,546 tons, or an increase of 92,972 tons this year. The average prices of warrants have been:

| Monthly Average Prices of Warrants. | | | | | |
|-------------------------------------|-------|--------|--------|-------|-------|
| Jan. | Feb. | March. | April. | May. | June. |
| 1885. 42/13 | 41/3 | 41/5 | 41/9 | 41/10 | 41/1 |
| 1884. 42/3 | 42/1 | 42/6 | 42/3 | 41/6 | 41/3 |
| July. | Aug. | Sept. | Oct. | Nov. | Dec. |
| 1885. 41/1 | 41/4 | 42/9 | 42/1 | 42/5 | 42/5 |
| 1884. 41/4 | 41/5 | 41/7 | 41/11 | 42/3 | 42/5 |
| Current prices are: | | | | | |
| Deliverable alongside. | No. 1 | No. 3 | | | |
| Gartsherrie, at Glasgow. | 46/6 | 48/6 | | | |
| Coltrose. | 50/6 | 46/6 | | | |
| Langloan. | 47/6 | 44/6 | | | |

| | | |
|---------------------------|------|------|
| Summerlee. | 51/4 | 45/ |
| Calder. | 51/ | 49/6 |
| Carnbroe. | 45/6 | 43/ |
| Clyde. | 48/ | 42/ |
| Monkland. | 48/ | 40/6 |
| Quarter. | 42/6 | 40/ |
| Govan, at Broomfield. | 43/ | 40/6 |
| Shotts, at Leth. | 47/ | 40/6 |
| Carron, at Grangemouth. | 51/ | 47/ |
| Kinnell, at Bo'ness. | 43/6 | 43/ |
| Glenarnock, at Ardrossan. | 46/6 | 42/6 |
| Eglington. | 43/ | 39/6 |
| Dalmellington. | 41/6 | 40/6 |

MIDDLESBORO' PIG IRON

is dull and rather weaker, with only a poor business moving. Current figures for G. M. B., f.o.b. at makers' wharves in the Tees, net cash, less 2½%, are:

| | | | |
|----------------|------|----------------|------|
| No. 1 Foundry. | 34/9 | Mottled. | 30/9 |
| " 2 " | 33/9 | White. | 30/3 |
| " 3 " | 32/3 | Refined metal. | 50/6 |
| " 4 " | 31/9 | Kentledge. | 43/6 |
| " 4 Forge. | 31/3 | Chlder. | 30/ |

WEST COAST HEMATITES

are steady at 41/9 @ 45/ for mixed lots in usual proportions. Stocks in the stores reach 98,883 tons, an increase of 34,940 tons to date this year. Shipments have been 467,053 tons, a comparative decrease of 82,443 tons. Steel-rail shipments from the West Coast ports have been 259,161 tons, a decrease of 6500 tons this year. Quotations are:

| | No. 1. | No. 2. | No. 3. |
|------------------|--------|--------|--------|
| Clearor. | 45/6 | 45/3 | 45/ |
| Lonsdale. | 45/6 | 45/ | 44/6 |
| West Cumberland. | 45/6 | 45/ | 44/6 |
| Lowther. | 45/6 | 45/ | 44/6 |
| Distington. | 45/6 | 44/6 | 44/ |
| Harrington. | 45/6 | 45/ | 44/6 |
| Solway. | 45/ | 44/6 | 44/ |
| Maryport. | 45/6 | 45/ | 44/6 |

Mr. Alexander Wilson succeeds his deceased brother George as manager of Chas. Cammell & Co., Limited, Sheffield, Workington, &c.

TIN PLATES.

In London during the week some of the makers have shown more disposition to meet the views of buyers as regards prices, but some of the works are still firm and refuse to accept orders for cokes below 14/6. The uncertainty as to the course certain firms will take next year in respect of the stoppage of operations one week out of every four is not operating very favorably on the market, and the future of values depends in a measure on the continuance of the combination among the makers. The stoppage of two well-known works this week is announced, and if arrangements are not made for resuming operations at an early date the fact must favorably affect the market. I quote ordinary 10 cokes 14/ @ 14/6, f.o.b. Liverpool. At Liverpool buyers are holding off, the actual demand for America being almost nil, and, paradoxical as it may appear, there are many makers most anxious to sell at what may well be termed the most inopportune time, as the present most undoubtedly is. When good brands of coke tin plates are offered in abundance at 14/ 10, with but few, if any, buyers for the States, it cannot be far wrong in terming the present a "crisis" in the trade, especially when there is but little hope of an improvement or a turn in the tide taking place this year at any rate. The only reason to account for the trade having come to the present pass is that there is considerable doubt entertained in certain quarters as to the certainty of the combination to reduce the make being continued over next year, or even over the first half, as was intended. So long as there is any doubt existing on this subject there will not be much, if any, forward business done except at extremely low prices. It is a most unsatisfactory state of affairs altogether. The American demand is but of small account just now, and the greatest difficulty has been experienced in putting any business through at even unusually low figures. There have been some orders for coke tins placed at 14/ 10, but not many, and even that figure is not obtainable now. The same may be said of Bessemer steel with coke finish at 14/ 10, but they are all off now. Siemens steel plates with coke finish are but in poor request, and 15/ 10 is not to be had but for exceptional lots, 14/ 9 10 being the figures now offering. Charcoal tins and ternes are also very quiet, with very few orders offering. There is a better demand for coke tins and Bessemer steels for the colonial and Continental markets, several orders having been placed.

THE HARDWARE TRADES.

In London the hope seems to predominate that the turn of the year will quicken enterprise and give the long-expected impetus to trade. The frost last week created quite a flutter of excitement in the skate trade, but unfortunately a thaw set in before any great clearance of the large stocks on hand was effected. In this district the retail trade is exceedingly slow—so much so that dealers declare it is not like the near approach of Christmas at all. Hardware goods suitable for presents have become distributed largely among other trades, and ironmongers apparently are not quite aware of this as much as they ought to be. At Birmingham there is not the rebound of trade yet which was looked for after the elections. Retailers apparently consider it too near Christmas to justify them in adding to stocks, more especially while prices continue so weak, and the home orders arriving are consequently of a retail character. Fancy goods, cheap jewelry and electro-ware are still in tolerably good request, and the demand for certain classes of culinary ware is apparently not yet satisfied. Traveling trunks and metallic trunks are selling fairly well, and there is a moderate business doing in lamps, though not in stoves or heating apparatus, the call for which has been checked by the return of mild weather. There was a brisk local demand for skates during the few days the frost lasted, but it was soon satisfied. In the shipping department some revival of inquiry is reported on account of the United States. Australia is ordering freely in some lines, and Cape orders by the last mail show a decided improvement. At Sheffield several influences have combined to throw a little more vitality into the lighter branches of local industry during the last week or so. Days. Altogether, therefore, employment is more general than might have been expected, and, as usual, the majority of the makers are doing their best to give their artisans an opportunity of earning as much money as possible to tide them over the holidays.

The Iron Age

AND
Metallurgical Review.

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The Nail Situation in the East.

The movement in nails has been of particular interest, because it has been almost entirely independent of the other branches of the iron and hardware trades. Early in 1885 nails, under a very heavy supply, declined to low figures. Under the stimulus of a moderate spring demand, aided by some co-operation among manufacturers in the East, they rallied a little. They fairly held their own during the early summer months, until the beginning of the strike in the Western mills brought a potent element of improvement into the situation. The belief was at first general among both consumers and producers that the strike would not last long. The former did not anticipate future wants to any considerable extent, while the latter appeared content with a gradually hardening market. Stocks in makers' and dealers' hands were allowed to sink by degrees to a low ebb under a moderately active demand. Orders came flowing to the Eastern mills from the West, and suddenly the trade began to realize that, with little prospect of a general resumption of work in the West, the productive capacity of the mills running was incapable of meeting the current demand. Many circumstances combined to make this revulsion of feeling sudden. As usual, buyers, who had become accustomed to a steadily declining market, had to be taught by repeated advances that its firmness was not a fiction. The country was very bare of stocks, and in some quarters a nail famine was actually impending. Prices went up with a rush, which only tended to give more confidence to the striking nailers in the West. With few solitary exceptions, every mill in the East and South was crowded to full capacity at very remunerative rates, while the Western nail manufacturers, who were waging a contest with their men for a principle, stood their ground firmly under the most adverse circumstances. One thing which tended to keep prices in the West lower than they might otherwise have been was that freights were low. Another factor which tended to make the discrepancy between supply and demand less serious was that, after all, the latter was by no means heavy for the season. In times of general activity in building throughout the country the famine would have been more intense and more prolonged. Although some speculation entered into the situation, it did not assume any marked proportions, while on the other hand the great mass of dealers and consumers persistently pursued a hand-to-mouth policy.

Another factor of the importance of which cannot be overrated was the wire nail.

The strike offered a splendid opportunity for its introduction, and the wire-nail manufacturers wisely improved it by a very conservative course. Their raw material was cheap then, and, while a number of advances were established, they followed the upward movement in cut nails at a distance, thus making every dealer and merchant an active partisan of the wire nail. We see on every hand the evidences of this wise policy. There can be no doubt that a very large number of important consumers have learned not alone to appreciate the economy of wire nails, pound for pound, at the established difference in prices, but that they have been taught to value them for many points of excellence they possess for special work. The wire nail has conquered territory which in the future it may claim as its own. The loss to the cut-nail makers is greater even than appears on the surface, because it affects sizes which are more remunerative than the ordinary assortments upon which the base is fixed.

Meanwhile the Western mills were steadily gaining ground with their feeders, and from week to week the number of machines reported to be in operation grew. With the approach of winter the demand, first from the North and the Northwest, showed symptoms of rapidly falling away. Almost simultaneously an advance was established in the rates of freight from Eastern mills to Western distributing centers, and the Eastern manufacturers saw themselves again narrowed down to their usual markets. In less than a month the price of carload lots in the New York market dropped from \$2.75 to \$2.25, with a few anxious sellers, some of them speculators, crowding the market only to frighten buyers by offering at low figures.

We have thus dwelt upon the history of the past six months in the nail trade because its happenings have considerable bearing on its future course. Some of the influences then at work are potent still, and other modifying factors are coming into play. The strike in the Western mills still continues, and, while the productive capacity has undoubtedly grown and is now fairly able to take care of the current demands, there can be no question that it would be unable to cope with the heavy requirements of the spring season. It is not impossible, therefore, that the West might at that time call for nails from the East. Meanwhile there are more nails being made in the latter section of the country than are wanted during the dull season. This the manufacturers recognize, and some of them have agreed to close down for four weeks during the period from January 1 to March 1. Others, fully aware of the necessity of replenishing stocks, are quietly piling up, content to await the recovery which is promised by the advent of spring. It looks, therefore, as though the early future would see in the Eastern markets few anxious sellers.

When last spring the battle was raging between the steel and the iron nails, it was predicted freely that the latter would quickly disappear. The long strike crowded these issues aside, and now they are again coming forward, though in somewhat different shape. The advance in raw materials for steel manufacture will tell more on the steel-nail maker than will the rise in forge on the producers of iron nail, and, though old rails have been crowded upward, the balance is temporarily turning again in favor of the iron nail. When speaking of steel nails we of course allude to those produced from metal made in the regular Bessemer process, and not those from Clapp-Griffiths steel or old steel rails.

To some extent the wire nail, too, will be hampered. Rods, it is true, are still cheap, but wire has advanced considerably, and the cost of raw material in the making of the wire nail must be greater. On the other hand there has been a very rapid increase in the number of wire-nail machines, and we may expect that product to crowd on the market in increasing quantities. This will operate against the maintenance of a higher level for cut nails, which seems otherwise justified by small stocks and an advance in raw material. A careful study of the situation makes it difficult to assent to the views freely expressed by many that nails are bound to recede to old figures. We may expect some temporary weakness, but it does not look, with the light we now have on the subject, as if the low-water mark of 1884 will be again touched this winter.

As foreshadowed in our last issue, the prices for standard brands of pig iron at tidewater markets have been placed at \$18 for No. 1 foundry, \$17 for No. 2 and \$16 for gray forge. These figures have been repeatedly referred to in the public prints as being the same as those ruling for the previous contracts. That is not the case. There has been an advance of \$1 on the two lower grades. The prices thus fixed are certainly low. They prove that the leading companies are guided by a conservative spirit and are justly doing all in their power to discourage the "boomers." The latter will find it a somewhat difficult matter to frighten consumers into the belief that prices are bound to go up with a rush, when the largest producers tributary to this market are ready to sell large blocks at moderate figures. Of course we hear, as usual, at the present time of the great sales which always follow the announcement of prices. The trade has learned to attach very little importance to these big figures, because they cover contracts which have considerable

capacity for shrinkage. As one of the peculiarities of the Eastern iron trade, they are tolerated with benevolent regard for the sanctity of ancient usage.

The Exchanges for 1885.

The various annual exhibits of the New York exchanges and other business organizations for the year 1885 are generally favorable, showing an increased volume of transactions compared with the previous year. The sales on the Produce Exchange made at the "calls" comprise 59,500,000 bushels of wheat, nearly 24,500,000 bushels of corn, upward of 4,100,000 bushels of oats, and 100,000 tierces of lard, while the total margins deposited were \$25,582,000, which is a little under the aggregate of the previous year. Depression to some extent was occasioned by the feeble export demand, and the prohibitory decrees of France, Germany and Austria against pork products operate prejudicially to an important interest. On the Consolidated Stock and Petroleum Exchange the total transactions in petroleum for the year amounted to 3,604,949,000 barrels. The highest price during the year was on October 20 and 21, when petroleum sold at \$1.12½ per barrel; the lowest was on January 16, when it sold at 68 cents per barrel. The average price for the year was 88½ cents.

The transactions of the Stock Exchange compare as follows for two years:

| | No. shares of stock. | Government bonds. | State and R. R. bonds. |
|-----------|----------------------|-------------------|------------------------|
| 1885..... | 83,184,478 | \$15,579,300 | \$662,772,042 |
| 1884..... | 85,082,082 | 14,579,700 | 598,515,800 |

Collector Hadden furnishes the following figures of the business done by the Custom-House during the year 1885, the last two days being estimated:

| | Imports. | Foreign exports. | Domestic exports. |
|-----------|---------------|------------------|-------------------|
| 1885..... | \$386,064,494 | \$9,516,568 | \$317,134,796 |

The total receipts for customs for 1885 were \$128,292,636 80; in 1884 they were \$132,416,696 94, showing, therefore, a falling off for the year 1885.

The Clearing-House exchanges for two years compare as follows:

| | Exchanges. | Balances. |
|-----------|-------------------|--------------------|
| 1884..... | \$90,985,871.10 | \$1,471,861,414.07 |
| 1885..... | 28,152,201,336.02 | 1,356,470,654.57 |

The Clearing-House has now a membership of 64. Three banks were admitted to membership during the year, viz.: West Side, Seaboard National and Sixth National. The Union National Bank went into liquidation on the 1st of November last.

The report of the Sub-Treasury, furnished by Assistant Treasurer Acton, shows receipts amounting to \$713,862,200, and payments equal in amount, covering transactions for the entire year. While the volume of business in the various departments above represented has been large, low prices have yielded only moderate profits, but the outlook for the coming year is considered hopeful.

Trade of British India.

The development of Indian trade and the satisfactory headway we have been making of late years in our domestic export to that country are worth noting. The returns of the Secretary for India for 1884-85 show the following trade movement:

| | Import. | Export. |
|--------------|--------------|--------------|
| 1879-80..... | 51,36,75,810 | 69,10,19,860 |
| 1880-81..... | 59,39,70,482 | 75,34,16,850 |
| 1881-82..... | 58,31,48,651 | 82,90,33,464 |
| 1882-83..... | 63,45,61,977 | 84,36,17,237 |
| 1883-84..... | 65,58,18,545 | 89,01,34,434 |
| 1884-85..... | 67,02,91,358 | 85,08,78,583 |

In the total trade of 1884-85 England figures with 55 per cent., and the following countries with the percentage indicated: China, 3; France, 6; the Straits Settlements, 3; the United States, 3; Germany, 3; Italy, 3; Belgium, 2; Ceylon, 2; Egypt, 2; Austria, 2; Mauritius, 2; Australia, 2; Persia, 1, and Arabia, 1. Seventy-eight per cent. of the import arrived via Suez, the same as the year before, and the export through that route in both years constituted 56 per cent. During the preceding two years the import and export reduced to pounds sterling were as follows:

| | 1882-83. | 1883-84. |
|-------------------------|-------------|-------------|
| Import..... | £52,096,000 | £56,499,000 |
| Specie and bullion..... | 13,453,000 | 12,578,000 |
| Total..... | £65,549,000 | £69,077,000 |

The large excess of export over import and the enormous absorption of specie and bullion will be noticed. The bulk of the latter two items being silver, the importance of its value in London is patent. The recent decline in silver is supposed to seriously affect Indian trade, inasmuch as the export of goods thither is to a certain extent checked thereby; but this, in the nature of things, can only be temporary. India, for example, takes from us rapidly increasing amounts of refined petroleum in tins, and it does not matter much whether the gallon is for the time being a couple of cents dearer or cheaper, as it will be taken all the same from the moment the large population takes to it. It is the immense population of India that makes her trade so valuable to other countries—to England especially. There is an almost unlimited sale for goods of large consumption properly introduced, and the market is not easily glutted in the ports, whereas with colonies having a small population, like Australia and the Cape, there are every now and then overstocked markets, when goods go begging at rates sometimes involving serious loss.

American trade with India for the fiscal years 1883 to 1885 was as follows:

| | Import. | Export. |
|-----------|--------------|-------------|
| 1883..... | \$17,699,257 | \$4,119,075 |
| 1884..... | 19,550,458 | 5,711,259 |
| 1885..... | 19,467,800 | 2,185,611 |

It will be seen that our domestic export nearly doubled in two years, while our import fell off, because indigo, hides, jute, &c., were cheaper.

The number of seagoing vessels entered and cleared from the ports of British India was as under:

| | Arrived. | | Sailed. | |
|--------------|----------|-----------|----------|-----------|
| | Vessels. | Tonnage. | Vessels. | Tonnage. |
| 1884-85..... | 5,150 | 3,291,009 | 5,158 | 3,332,761 |
| 1883-84..... | 5,512 | 3,632,305 | 5,550 | 3,618,296 |
| 1882-83..... | 5,864 | 3,538,878 | 5,851 | 3,523,006 |

The falling off in the number and tonnage of vessels the last fiscal year was due to less wheat being shipped to England and other European countries. The wheat received in England in the years named below was as follows:

| | 1882. | 1883. | 1884. |
|---|------------|------------|------------|
| From India. | Cwt. | Cwt. | Cwt. |
| North and South America on the Atlantic..... | 8,477,479 | 11,243,597 | 8,000,909 |
| All American and other Pacific countries..... | 42,836,885 | 37,396,750 | 32,946,697 |
| Russia..... | 14,712,393 | 11,896,637 | 8,264,810 |
| Total..... | 9,571,021 | 13,535,358 | 5,401,964 |

Railroad extension having a direct bearing on the future wheat supply, it is interesting to note that on April 1, 1885, there were in operation 12,004 miles. The number of passengers forwarded was 73,815,119 in 1884, against 65,098,953 in 1883, and there were forwarded 16,663,007 tons of goods. The gross earnings amounted to £16,066,225, expenses to £8,156,157, leaving £7,910,068 net earnings.

The public indebtedness on March 31, 1884, was:

| | |
|---------------------------------|--------------|
| Consolidated debt of India..... | £161,300,221 |
| Floating debt..... | 10,277,724 |
| Total..... | £171,577,945 |

The actual income and outlay for the years named were as follows:

| | Gross revenue. | Expenditure. |
|--------------|----------------|--------------|
| 1881-82..... | £75,141,601 | £72,991,873 |
| 1882-83..... | 70,125,231 | 69,418,597 |

The budget estimates were as follows:

| | Gross revenue. | Expenditure. |
|--------------|----------------|--------------|
| 1884-85..... | £62,991,300 | £70,707,406 |
| 1885-86..... | 72,090,400 | 71,582,306 |

The expenditure in 1883-84 included the following items: Interest on the debt, £4,276,266; paid tax collectors, £6,855,503; police, £2,761,054; public schools, £1,184,104; aid extended to famine-stricken districts, £1,500,000; army, £16,975,750; public works, £18,614,594; loss sustained in exchange, £3,338,756. The latter item is an unpleasant one, representing, as it does, the difference between gold and silver in paying in sterling such items abroad and at home as cannot be liquidated in the baser metal. India's silver standard is one of the greatest drawbacks to its finances and trade, and the worst of it is that it has grown to such magnitude that the country cannot extricate itself. But for the unlimited natural resources of this magnificent British possession, the financial and monetary outlook would be dismal in the extreme.

Some Notable Features of the Nail Strike.

The strike in the nail mills of the West, as we have before pointed out, has developed some interesting features that will render it exceptional in the annals of labor contests. One of the most important features of the strike has been the successful displacement of the nailers by their under-hands, the feeders. It has not been unusual on the part of the manufacturers during strikes to endeavor to operate their works by apprentices or under-hands. In the iron mills helpers have been given furnaces, both puddling and heating, and roughers or catchers rolls, but these efforts to operate mills with under-hands have been spasmodic, confined to a few mills, and have at last resulted in failure, though in particular cases the under-hand has shown so much skill as to justify his retention as a puddler, a roller or a heater. But the attempt in the nail trade to supply the places of striking over-hands by their assistants is not spasmodic, but systematic and persistent. It is not confined to a mill here and there, but is undertaken at the mills of entire and important districts. The attempt gives no signs of failure; on the contrary, the number of machines run in these mills is increasing weekly, and the product turned out is not inferior to that made by regular nailers.

Another feature of the strike so far as it has progressed, and one that promises to be maintained when the strike is over, is that the iron manufacturers are keeping faith with the men who take the strikers' places. So often when strikes are over the manufacturers have not retained in their positions men who have assisted them during strikes that ironworkers have had but little faith in their promises, and have betrayed on the one hand no anxiety when they saw their places occupied by others, believing, notwithstanding any promises that were made, that they would recover them when the strike was over; and on the other hand, men would refuse to accept situations during strikes because they also believed that all promises made at such times were only made to be broken. This strike promises to be an exception, and in keeping faith with their feeders the nail manufacturers will go far toward restoring confidence in the good faith of all iron manufacturers.

Still another feature of the strike is one that is manifesting itself in other trades,

viz., a clash of unions. It is announced that the nailers and feeders who are at work on the manufacturers' scale have formed a union to protect their interests and effected a permanent organization. This will complicate and intensify the struggle, and add still further to the difficulty of a settlement. This method of meeting unionism with unionism has been used to but slight extent, though it has been evident in many cases that, on the one hand, strikes had been undertaken and conducted in opposition to the wishes of many of the members of the unions, or, on the other hand, the unions had declined to engage in strikes when many members desired that they should.

As we have suggested, many recent strikes have been for the supremacy of warring factions inside the unions or in the trade, and unions have been formed as the result of extreme dissatisfaction with the methods and management of old unions. This new nailers' union is an evidence of this, just as the old nailers' union was the outcome of dissatisfaction with the Amalgamated Association. The great problem in connection with trades unionism is how to preserve anything like liberty of speech and action on the part of individuals or groups and still maintain unionism. This formation of separate unions in the same trade is an attempt to solve this question. Both unions may not continue to exist, but this result will be greater freedom of speech and action and greater conservatism.

Dust Fuel for Boilers.

Discussions relative to proper and efficient means of utilizing coal dust as a heat-producing agent have hitherto been to some extent one-sided and comparatively little thought has been given to methods of burning the fuel directly in its dust form. Accordingly we find a somewhat remarkable lack of uniformity in practice, large grate surface and slow combustion being advocated in some quarters, while exactly the reverse is commended in others. This was very strikingly illustrated in one of the topical discussions at the last meeting of the American Society of Mechanical Engineers. The general features of the plan adopted on the new locomotives of the Reading Railroad for burning anthracite culm were there described as a large grate area, the grate measuring 4 x 16 feet, and slow combustion, with which, as stated at the time in our columns, reasonably good results were obtained. On the other hand it was remarked that the Lackawanna Iron and Coal Co., of Scranton, Pa., pursued exactly the opposite plan in using rapid combustion with a small grate area. In this case also good results were claimed, and yet in either one case or the other objectionable features prejudicial to good working must be found. It is, of course, very justly claimed for slow combustion that it avoids the production of clinkers, which are unavoidable results of the comparatively high temperature brought about by the use of forced draft in the rapid-combustion plan, and yet it may be claimed with equal propriety that natural draft would scarcely suffice to effect complete combustion of the fuel.

Carefully balancing the advantages and disadvantages of the two methods, and determining in this way which under ordinary circumstances would prove the more satisfactory one, is thus yet to be carried out, and light on this subject would prove most welcome. As matters now stand it seems that different methods are pursued in different places simply because only one method may have been tried in a certain place and may have been found sufficiently satisfactory to make further experiment undesirable, and not because improvement cannot be effected. Closer investigation of the requirements of successful dust-burning is therefore in urgent demand, and would most certainly bring some things to light which are important, but now unknown, factors in the problem. Failures of earlier attempts would be more readily explained, and necessary measures could be taken to insure better results in the future.

During the past few weeks the advance in old rails, brought about largely by a speculative movement, and the sales of foreign Bessemer pig and of foreign ores, have again directed considerable attention to markets abroad. The holders and producers in Europe have been keenly alive to the possibilities offering themselves to them from any demand from us; in fact, they have tremendously exaggerated them. The unwarranted boom talk of our own newspapers has been reflected and magnified by all correspondents of English journals, with one or two notable exceptions. The idea has been fostered there—and, we may add, has some partisans here—that we may become as heavy buyers abroad as we were in 1881 and 1882. The conditions are widely different in many respects. We need not refer to the changes that have gone on in this country since that time, to the enlargement of plant, and, above all, the cheapening of cost, because there is one factor which will need to be dwelt upon particularly. During the boom period we were very heavy exporters of grain, and employed an enormous tonnage to convey it across the Atlantic. Every tramp steamer, every old vessel capable of crossing without imminent danger of foundering on the way, came to our shores bringing iron at often nominal rates to take back more remunerative cargoes. Now it is different. A demand for tonnage to convey iron and

steel here was promptly reflected in higher rates of freight, because there was little prospect of getting anything to take back from this side. Unless our farmers and speculators allow grain to drop to prices which will induce buyers abroad to take hold this condition of affairs is likely to continue, and freights will be a greater factor than they have been in the past. What business has been done thus far has been on the basis of the lowest quotations for material abroad and low freights. Prices of goods and rates of freight both advanced materially, and now the business is practically checked. This will give our home producers more latitude to advance without giving foreign makers an opportunity to unload what are in some cases unprecedentedly heavy stocks. Of course such advances should be cautiously made, and we believe that those engaged in the manufacture of iron and steel are in accord on this point. They will do all they can to discourage wild speculation, since they have learned how disastrous it is to their best interests. They do not want to see hundreds of thousands of tons of foreign material coming in from abroad and a mushroom growth of new plants at home.

The cable brings a rumor that the present Government of England intend to introduce some sort of a protective tariff measure that will be retaliatory in its character—that is, that will levy duties upon imports from those countries that do not admit goods of English manufacture at rates that are satisfactory to England. This may be merely a rumor without foundation in fact, but in view of the utterances of some of the leaders of the party in power it is at least a plausible one. The Tory party is at heart a protectionist party. The demand of the English workingman, both the agricultural laborers and mechanics, for some protection is growing in intensity, and the answer to it is reported to be retaliatory tariffs. This may be human nature, but it is not statesmanship. England's efforts at retaliation and their results should have taught her not only their unwisdom, but their futility.

Condition of the Blast Furnaces of the United States, January 1, 1886.

We give on the next page our usual monthly report of the condition of the blast furnaces of the country. This is also what has heretofore been our quarterly report. But two furnaces are missing, both charcoal, one each in Utah and Oregon. The one in Utah is out of blast and of little or no importance, and the Oregon furnace does not affect the result, so that the report may be regarded as complete.

In a condensed form the table makes the following showing as to the condition of the furnaces January 1, 1886:

| Fuel. | In blast. | | Out of blast. | |
|-----------------|-----------|------------------|---------------|------------------|
| | No. | Weekly capacity. | No. | Weekly capacity. |
| Charcoal..... | 57 | 7,804 | 169 | 16,678 |
| Anthracite..... | 104 | 29,811 | 117 | 25,518 |
| Bituminous..... | 114 | 54,199 | 106 | 40,508 |
| Total..... | 275 | 91,814 | 392 | 82,704 |

This shows a marked change since the first of December. At that time the record was as follows:

| Fuel. | In blast. | | Out of blast. | |
|-----------------|-----------|------------------|---------------|------------------|
| | No. | Weekly capacity. | No. | Weekly capacity. |
| Charcoal..... | 61 | 8,960 | 163 | 15,582 |
| Anthracite..... | 94 | 29,811 | 128 | 28,438 |
| Bituminous..... | 99 | 49,790 | 122 | 44,917 |
| Total..... | 254 | 88,561 | 413 | 88,937 |

Twenty-one new furnaces, on the whole, are in blast, divided as follows: 4 less charcoal, 10 more anthracite, and 15 more bituminous. The decrease in the capacity of the charcoal furnaces in blast is about 550 tons weekly, the increase in the capacity of the anthracite about 3000, and of the bituminous some 4400. As a rule, the furnaces now blowing in are not of as large capacity as some of those that have been in blast. The increase in anthracite furnaces has been in New York and the Lehigh and Schuylkill valleys in Pennsylvania; in bituminous stacks, chiefly in the Shenandoah and Mahoning valleys and the Hanging Rock region. Other furnaces are preparing to blow in, and it is probable that February will find an increase, but not as marked as the past two months.

Since the first of October there has been a decided increase. At that time 75 anthracite furnaces, with a capacity of 20,318 tons, were in blast. January 1 it had increased to 104 furnaces, with 29,811 tons capacity. The bituminous furnaces had increased in the same time from 88, with a capacity of 43,234 tons, to 114, with a capacity of 54,199 tons.

The number of anthracite and bituminous furnaces in blast at the beginning of each month of the last year and the first month of the present, together with their weekly capacity, is as follows:

| 1885. | Anthracite. | | Bituminous. | |
|------------------|---------------|--------------------|---------------|--------------------|
| | No. in blast. | Capacity per week. | No. in blast. | Capacity per week. |
| January 1..... | 80 | 21,564 | 82 | 30,812 |
| February 1..... | 81 | 21,189 | 87 | 46,032 |
| March 1..... | 86 | 22,089 | 91 | 46,774 |
| April 1..... | 82 | 21,704 | 90 | 45,655 |
| May 1..... | 90 | 29,720 | 95 | 43,297 |
| June 1..... | 79 | 19,884 | 94 | 44,628 |
| July 1..... | 81 | 30,444 | 92 | 48,945 |
| August 1..... | 77 | 30,530 | 94 | 48,845 |
| September 1..... | 78 | 30,190 | 88 | 42,668 |
| October 1..... | 75 | 30,818 | 88 | 43,234 |
| November 1..... | 82 | 34,370 | 90 | 44,101 |
| December 1..... | 94 | 30,816 | 99 | 49,790 |
| 1886. | | | | |
| January 1..... | 104 | 29,811 | 114 | 54,199 |

One year ago the condition of the furnaces and capacity were as follows:

| Fuel. | In blast. | | Out of blast. | |
|-----------------|-----------|------------------|---------------|------------------|
| | No. | Weekly capacity. | No. | Weekly capacity. |
| Charcoal..... | 68 | 8,871 | 159 | 15,941 |
| Anthracite..... | 86 | 21,564 | 135 | 28,500 |
| Bituminous..... | 82 | 30,812 | 141 | 55,812 |
| Total..... | 236 | 66,747 | 435 | 100,253 |

This shows a material increase during the year—18 anthracite furnaces and 32 bituminous. The year 1885 shows a reduction of 23 anthracite and 19 bituminous.

The relative condition of the blast-furnace industry for the past seven years is shown in the following condensed table of furnaces in and out of blast on the first days of January, 1880-86:

| NUMBER OF FURNACES IN BLAST, JAN. 1. | | | | | | | | | |
|--------------------------------------|-------|-------|-------|-------|-------|-------|-------|--|--|
| | 1880. | 1881. | 1882. | 1883. | 1884. | 1885. | 1886. | | |
| Charcoal..... | 93 | 160 | 155 | 133 | 78 | 68 | 57 | | |
| Anthracite..... | 105 | 162 | 169 | 169 | 109 | 96 | 104 | | |
| Bituminous..... | 136 | 151 | 142 | 138 | 101 | 82 | 114 | | |
| Total..... | 334 | 473 | 466 | 440 | 288 | 246 | 275 | | |

| NUMBER OF FURNACES OUT OF BLAST, JAN. 1. | | | | | | | | | |
|--|-------|-------|-------|-------|-------|-------|-------|--|--|
| | 1880. | 1881. | 1882. | 1883. | 1884. | 1885. | 1886. | | |
| Charcoal..... | 146 | 114 | 117 | 139 | 169 | 159 | 169 | | |
| Anthracite..... | 67 | 70 | 67 | 64 | 122 | 135 | 117 | | |
| Bituminous..... | 80 | 68 | 78 | 88 | 125 | 141 | 106 | | |
| Total..... | 293 | 256 | 262 | 280 | 416 | 435 | 392 | | |

Secretary Manning has issued the first bond call which has been published in over a year. This will be regarded with general satisfaction. The people of this country demand that the national debt shall be extinguished as rapidly as possible without risk or increased burdens, and that vast sums of surplus revenue shall not be hoarded by the Treasury for any purpose other than the legitimate needs of economical administration. Mr. Manning has shown what seems to be an excessive prudence in this matter, and in following the example of his official predecessors he has done wisely. It is true that he may have been led to this decision by the evidences of a gathering storm, of which the first gust was experienced in the speech of Senator Beck. The action of the Bank of England in raising its rate of discount to invite gold to London may also have influenced his action, when emphasized by the demand of the banks for gold to make good the exports. So able a financier as Mr. Manning could scarcely have questioned the ability of the Treasury to meet its obligations with \$400,000,000 available surplus, and, since no better use can be made of money than to employ it in liquidating debts, we are glad that Mr. Manning has decided that a bond call can safely be made.

WASHINGTON NEWS.

(From Our Regular Correspondent.)
WASHINGTON, D. C., January 5, 1886.

It was expected when the House reassembled to-day that the committee would be announced. The Speaker, however, was not quite prepared, and the call of States for bills and resolutions for reference only was continued. Should the call be concluded to-day, it is possible that the list will be submitted. There has been much competition for chairmanships on the principal committees, which has caused some delay. The Committee on Ways and Means has been constituted in deference to the wishes of Mr. Morrison, and so far as the Democratic Members are concerned, will represent his views.

THE SENATE COMMITTEE ON FINANCE.

The Senate Committee on Finance will take up the Cameron resolutions against reopening the tariff controversy as soon as some of the more urgent nominations shall have been disposed of. If the committee will make a report the resolutions themselves will lead to a lengthy discussion. In the House the issue will be made, and Mr. Morrison will be ready to submit his bill as soon as the House gets well settled down to business.

RECENT DECISIONS.

The following decisions have been rendered by the Secretary of the Treasury under the metal schedule:

Certain so-called crude mineral substance, which, upon analysis, was found to contain 67 per cent. of metallic manganese and 7 per cent. of metallic iron, was held to be entitled to free entry under the provision in free list, T. I., new, 621, for "manganese, oxide and ore of."

Small compasses, with a lead-pencil arranged on one point, although of an inferior class, and perhaps intended to be used more generally by children, are, nevertheless, not dutiable under the provision for "toys," but, being otherwise enumerated, are dutiable at the rate of 45 per cent. ad valorem, under the provision in Schedule C, T. I., new, 216, for "manufactures, articles or wares, * * * composed wholly or in part of iron."

Articles of gold or silver, jewelry, precious stones, &c., cannot be legally imported through the foreign mails; but, if imported, will be liable to forfeiture under the existing laws.

CORRECTION OF DUTY.

So-called errors in classification of imported merchandise, involving the correction of rates of duty, are not errors of fact in liquidation, and can only be corrected upon the importer making due protest and appeal, and otherwise complying with the requirements of Section 2931 of the Revised Statutes.

AMENDMENTS IN THE SHIPPING LAWS.

Congressman Dingley, of Maine, introduced a bill on Tuesday to cure some of the defects which experience has shown to exist in the law of the last Congress which bears his name, and also to remove certain other

CONDITION OF THE BLAST FURNACES OF THE UNITED STATES, JANUARY 1, 1886.

(Compiled for The Iron Age.)

| Location of Furnaces. | Charcoal. | | | | Anthracite. | | | | Bituminous or Coke. | | | |
|---------------------------------------|-------------------------|---------------------------|--------------------|-------------------------------|-------------------------|---------------------------|--------------------|-------------------------------|-------------------------|---------------------------|--------------------|-------------------------------|
| | Total number of stacks. | Number reported in blast. | Capacity per week. | Number reported out of blast. | Total number of stacks. | Number reported in blast. | Capacity per week. | Number reported out of blast. | Total number of stacks. | Number reported in blast. | Capacity per week. | Number reported out of blast. |
| New England..... | 14 | 8 | 710 | 6 | 475 | 1 | 0 | 1 | 160 | 1 | 0 | 1 |
| New York..... | 14 | 2 | 165 | 12 | 970 | 40 | 13 | 4,140 | 27 | 6,530 | 1 | 0 |
| New Jersey..... | 16 | 6 | 2,200 | 10 | 2,642 | 3 | 3 | 275 | 0 | 0 | 0 | 1 |
| Pennsylvania..... | 32 | 8 | 585 | 24 | 1,284 | 51 | 31 | 9,898 | 20 | 5,067 | 1 | 0 |
| Lehigh Valley..... | ..... | ..... | ..... | ..... | ..... | 44 | 19 | 4,700 | 25 | 5,275 | 1 | 0 |
| Schuylkill Valley..... | ..... | ..... | ..... | ..... | ..... | 24 | 11 | 2,713 | 13 | 2,240 | 0 | 1 |
| Upper Susquehanna Valley..... | ..... | ..... | ..... | ..... | ..... | 37 | 19 | 5,585 | 18 | 3,075 | 16 | 13 |
| Lower Susquehanna Valley..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 9,630 | 3 |
| Pittsburgh..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 1,000 | 0 |
| Allegheny Valley..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 500 | 3 |
| Shenandoah Valley..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 6,320 | 14 |
| Youghiogheny Valley..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 1,701 | 1 |
| Junata and Conemaugh Valleys..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 4,544 | 11 |
| Maryland..... | 15 | 0 | 0 | 15 | 1,005 | 5 | 2 | 300 | 3 | 520 | 1 | 0 |
| Virginia..... | 30 | 9 | 408 | 21 | 1,125 | ..... | ..... | ..... | ..... | ..... | 3,351 | 5 |
| North Carolina..... | 6 | 1 | 120 | 5 | 304 | ..... | ..... | ..... | ..... | ..... | 906 | 2 |
| West Virginia..... | 5 | 1 | 100 | 4 | 180 | ..... | ..... | ..... | ..... | ..... | 4,265 | 10 |
| Ohio—Mahoning Valley..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 4,080 | 10 |
| Central, Eastern and Northern..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 732 | 10 |
| Hocking Valley..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 1,620 | 6 |
| Hanging Rock..... | 19 | 5 | 500 | 14 | 1,260 | ..... | ..... | ..... | ..... | ..... | 750 | 1 |
| Miscellaneous..... | 2 | 0 | 0 | 2 | 400 | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Kentucky..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Hanging Rock..... | 5 | 1 | 120 | 4 | 375 | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Western Region and Miscellaneous..... | 8 | 0 | 0 | 8 | 875 | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Tennessee..... | 9 | 1 | 240 | 8 | 890 | ..... | ..... | ..... | ..... | ..... | 2,270 | 3 |
| Georgia..... | 6 | 0 | 0 | 6 | 457 | ..... | ..... | ..... | ..... | ..... | 1,600 | 0 |
| Alabama..... | 11 | 7 | 1,810 | 4 | 660 | ..... | ..... | ..... | ..... | ..... | 3,820 | 3 |
| Indiana..... | 1 | 0 | 0 | 1 | 140 | ..... | ..... | ..... | ..... | ..... | 400 | 0 |
| Illinois..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 5,850 | 12 |
| Michigan..... | 26 | 11 | 2,386 | 15 | 3,060 | ..... | ..... | ..... | ..... | ..... | 2 | 0 |
| Wisconsin..... | 11 | 1 | 100 | 10 | 1,281 | ..... | ..... | ..... | ..... | ..... | 550 | 2 |
| Minnesota..... | 1 | ..... | ..... | 1 | 200 | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Missouri..... | 9 | 1 | 350 | 8 | 1,538 | ..... | ..... | ..... | ..... | ..... | 1,310 | 4 |
| Texas..... | 2 | 1 | 210 | 1 | 100 | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Utah..... | 1 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Oregon..... | 1 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Colorado..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Total..... | 228 | 57 | 7,804 | 169 | 16,678 | 221 | 104 | 29,811 | 117 | 25,518 | 220 | 114 |
| | | | | | | | | | | | 54,199 | 106 |
| | | | | | | | | | | | 40,508 | |

burdens upon the American merchant marine which were left untouched by the former law. The absolute prohibition of the assignment of seamen's wages for board and clothing has not worked well, and the new bill proposes certain amendments. The bill further proposes to relieve all vessels of the United States from the payment of any fees to collectors of customs, inspectors of steam vessels or shipping commissioners for any marine documents, certificates, admeasurement, inspection or other official service required by the navigation laws of the United States, or for service in shipping and discharging seamen. Collectors and other officers, who are now paid wholly or in part by fees, after the passage of this bill will be paid their fees by the Secretary of the Treasury in a manner similar to that provided by the Dingley law of 1884 for the payment of consular fees.

A NEW STEAMSHIP COMPANY.

In the House of Representatives, on Tuesday, Representative Belmont, of New York, presented the petition of Austin Corbin, setting forth that "with his associates he has formed an incorporated company under the laws of the State of New York, to be called and known as the American Express Steamship Co., with a capital of \$10,000,000, for the purpose of constructing, purchasing and owning a fleet of first class passenger steamships, to run between the City of New York or some port on Long Island and a suitable port or ports in Great Britain, and he prayed the passage of an act authorizing the registry of all of the vessels owned by the said company as vessels of the United States, whether built in the United States or elsewhere, providing that no vessel of foreign construction built or purchased by the said company shall be entitled to register unless the same shall be capable of a speed of at least 18 knots per hour, as shown by its trial trip or otherwise, nor having less than 7000 nominal horse-power."

American Locomotives of 1885.

During the year 1885 fewer locomotives were built in the United States and Canada than in any year since 1880. By correspondence with locomotive builders and the leading master mechanics the *National Car Builder* obtained a fair approximation of the number of engines built throughout the country, although great reluctance was displayed in many quarters to reveal the limited extent of production. From the information obtained by our contemporary it appears that seven of the leading builders sold 616 locomotives during the year, and it is a liberal estimate to credit the builders who declined to let their production be known, and the various railroad shops, with 200 more locomotives. This would bring the full list to about 800. Of the engines built 83 were for export, leaving about 717 to supply the home demand. Two years ago the seven builders that turned out 616 locomotives this year built 1346 engines, and the trade was beginning to grow depressed then. But that year 282 locomotives were exported from the United States, the whole being valued at nearly \$3,000,000. The condition of matters abroad that reduced exports to their present dimensions indicates serious depression in foreign railroads as well as among our own.

The intense depression in our locomotive building has not been caused by the railroads being overstocked with motive-power, for many of the roads are very much in want of engines, and the managers only refrain from buying new ones because it is possible

to get along a few weeks or months longer before the outlay is imperative. This is not good management, for the work is now done with worn-out machinery at increased expense, and the renewals will be delayed till the prices of locomotives begin to advance rapidly, when the orders will help to bring about another period of fancy prices. The practice followed by so many railroad managers of permitting their machinery to go without renewal or proper maintenance during times of business depression exercises a most injurious influence on the country's industries, for it tends to force business down in dull times and gives trade an artificial lift when the reaction comes round. It appears to be the course of natural retribution that the roads which follow the policy indicated should have to pay fancy prices for their machinery when they get ready to buy, and the only cause of regret about that is that their pernicious policy punishes innocent parties.

Remarkably few locomotives have been built in the railroad shops during the last year, and the new work done has been carried on principally to steady the fluctuations of repair work. Considerable attention has been directed to working out improvements on the locomotive. Seasons of depression in the transportation business have always exerted a stimulating effect upon the progress of locomotive improvement. The way in which most of our railroads are operated leaves very little opportunity to work out improvements in machinery when business is active, for the demands of transportation are generally beyond the capacity of the motive-power, and all that is thought of is to get the trains moved. But when freight is hard to find, when rates are low and locomotives at a discount, the demand arises for reduced expenses, and attention is directed to the problem of making the locomotive do its work at less expense for fuel and repairs. In many quarters master mechanics are striving to find ways and means for taking more of the heat out of the products of combustion by imparting to the water part of the heat that usually passes into the smoke-stack. Others are working on the problem of taking more work out of the steam as it passes through the cylinders, while many are still engaged working out the simplification of parts that reduces the expense of repairs.

Regarding fuel economy in locomotives our contemporary says that those who are striving to utilize more of the heat produced by the coal are apparently working in the line of experiment likely to yield the best results. The leading fault found with the American locomotive by its detractors has been that it evaporates too little water for the fuel consumed. The best friends of the engine can hardly say that the accusation is groundless. We have some locomotives evaporating as much water per unit of heat in the fuel as any locomotive running, but that is not the characteristic of our engines. There is serious waste of fuel going on that ought to be avoided. Various causes contribute to waste of coal by our locomotives. The first cause which ought to be susceptible of the easiest remedy is bad firing.

A great deal has been said and written in the last few years about improving the methods of firing our locomotives, but the majority of firemen work on in their own wasteful way undisturbed. So long as the autocrat of the scoop is permitted to laugh the principles of combustion to scorn, the locomotive designer cannot produce an engine that will make a good record in economy of fuel. Improvements in the methods of supplying air to the fire will, probably, in many engines produce more efficient combustion of the gases, but the most important and promising line to work

on after improving the character of firing is to find the means of increasing the difference between the fire-box and smoke-box temperature. The smoke-box temperature of our locomotives averages about 200° higher than it ought to do. This represents great loss of heat. The master mechanic who succeeds in reducing the smoke-box temperature of his engines 150° or 200° while maintaining the fire-box temperature will make his work felt on the coal pile.

Our master mechanics who are interesting themselves in taking more work out of the steam are doing nothing in the way of compounding the locomotive. Our most advanced and enterprising railroad mechanical men have no expectation that a compound locomotive would be successful. In various ways attempts are being made to obtain more expansion of the steam by using improved valve gear, and some of those who have applied this line of improvement to slow-working locomotives speak very encouragingly of the results. There are hundreds of locomotives working on our mountain roads that receive no benefit whatever from the expansion of steam. There ought to be no difficulty in effecting material improvements on locomotives doing work of this character. Improving the distribution of steam in a high-speed locomotive is a more difficult problem, for some of our best link-motion engines use the steam in a way that leaves little to be improved.

A London dispatch says: France is suffering from the long continuance of severe commercial and financial depression. And there seems to be no prospect of relief. For the month of November the figures of French imports and exports show a decline of \$15,000,000, as compared with the

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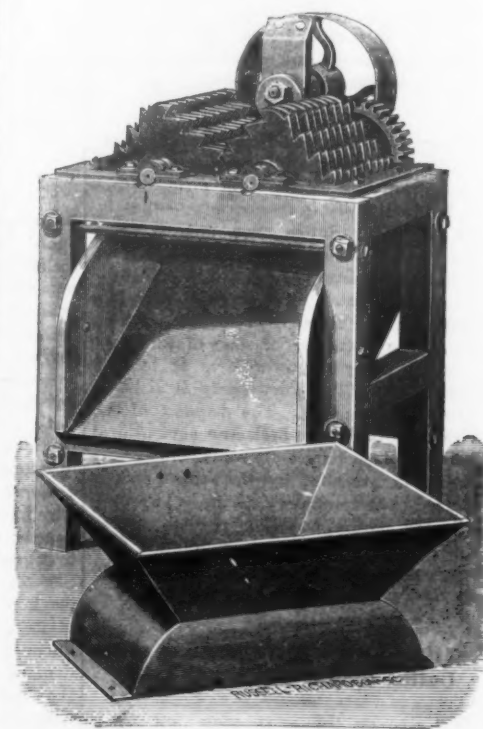
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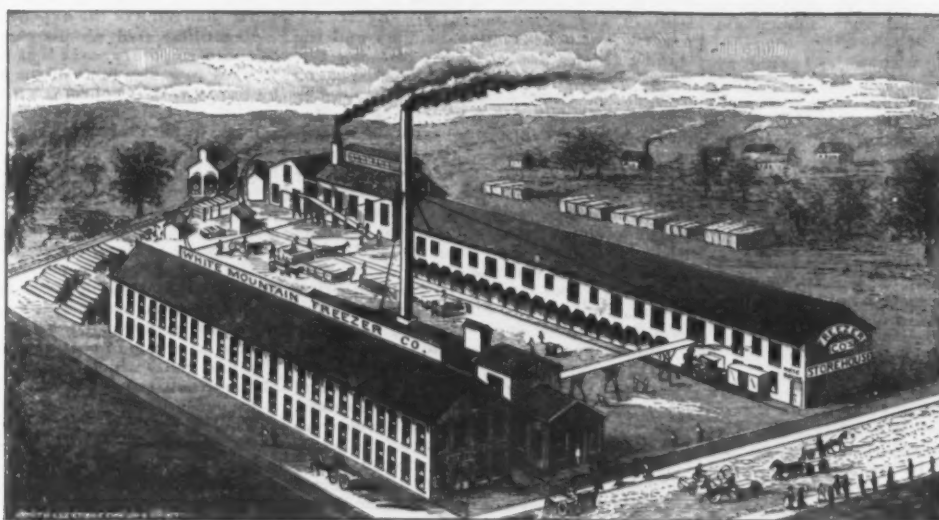
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Special Notices.

RECENT BOOKS.

Thurston.—*The Materials of Construction.* By Prof. Robert H. Thurston; 697 pages, 8vo, cloth. \$5.

This is an abridgement of the larger work in three volumes, entitled "The Materials of Engineering." The origin, nature, method of preparation and the properties of all the common and useful metals, and their strength, elasticity and other qualities essential to their introduction into the various constructions which the engineer is called upon to build or inspect, are treated of at considerable length, and the influence of the more common conditions affecting them is studied. The chapters on the reduction of the ores of the metals are substantially as complete as in the unabridged work. Those treating of the properties and uses of those metals are but slightly condensed, and the portion of the treatise relating to the alloys retains the more essential facts. In the condensation of the matter found in the original the effort has been to select for excision mainly the parts which give at great length the details of the less important processes and the less essential data obtained by experiment. The general and the average results have been retained. The value of the work is beyond question, and justly deserves and will undoubtedly gain wide popularity.

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Wanted.

A partner with \$3000 or \$4000, to take half interest in a well-established Hardware Store and Vehicle Business; business situated in the best section of Virginia, in good growing town. For particulars, address "F. B.," Box 19,
Office of *The Iron Age*, 83 Reade St., New York.

Wanted.

Planer and Boring Mill, with all the latest improvements; Planer to have capacity of 8 by 30 ft.; Boring Mill 8 to 10 ft.
Address N. A. RAIL MILL CO.,
New Albany, Ind.

WANTED, by a thoroughly competent Hardware man of seven years' experience, a situation as traveler or other good position with manufacturer or jobber. References of late employers. Address "J. D.,"
Office of *The Iron Age*, 83 Reade St., New York.

WANTED, MALLEABLE CASTINGS.

Manufacturers in this line to contract for Belt Fastenings. Specifications furnished on application. Address "B. H. CO.,"
Office of *The Iron Age*, 83 Reade St., New York.

A young man desiring practice in mechanical draughting wants situation. Good Penman and Mathematician. Salary no object.
Address "A.," Box 88,
Office of *The Iron Age*, 83 Reade St., New York.

Wanted.

TRAVELING SALESMAN. One of experience and extended acquaintance with the wholesale Hardware Trade East and West may give entire time to our line or take one or more non-conflicting lines. Salary or commission.
Address "MANUFACTURER,"
Office of *The Iron Age*, 83 Reade St., New York.

FOR SALE.—A well-established Stove, Plumbing, Tinware, Slatting, Glass and Crockery business, doing a good paying trade; has large orders on hand; situated in a thriving town within 50 miles of New York City. This is a chance seldom offered. Must be sold, as the proprietor has another business to attend to. Address "D.,"
234 Water St., New York.

Special Notices.

SPECIAL NOTICE.

WE ARE NOW OFFERING

SPECIAL DISCOUNTS

ON

SHAFTING COUPLINGS, HANGERS AND PULLEYS.

The Edison Shafting Mfg. Co.,

86 to 92 Goerck St., New York.

CATALOGUES AND PRICE LISTS MAILED
ON APPLICATION.

RECEIVER'S SALE

OF

MACHINE SHOP, FOUNDRY AND
BLACKSMITH SHOP.

All Materials, Machinery, Tools, Fixtures and Personal Property in the Iron Foundry, Machine Shop and Blacksmith shop of G. H. Zschech & Co., Nos. 180 to 190 South Pennsylvania St., Indianapolis, Indiana, are offered for sale by order of Court.

Said Iron Foundry and Shops are in good running condition. The plant is well equipped with Circular and Band Saw Mills and all other articles usually made in a first-class foundry are successfully manufactured here.

Private offers for all or any part of the property will be received by the receiver at any time before February 14, 1886, and will be at once reported to the Court.

Sealed bids on all or any part of the property, in cash or upon such terms as may be offered, will be received at any time before noon, February 15, 1886.

All the property will be offered at public auction on the premises, in parcels and as an entirety, at one o'clock p. m. on February 15, 1886, excepting one Planer and certain Patents, which will be offered separately. The terms of sale at auction will be one-third cash, one-third in six and one-third in twelve months. At the conclusion of the auction sale the sealed bids will be opened and reported to the Court.

All offers are subject to the approval of the Court.

A complete inventory and appraisal will be mailed on application.

JAMES JOHNSON,
Receiver of G. H. Zschech & Co., Indianapolis.

REMOVAL.

On the 1st of January, 1886, we will move to the spacious building 707 Broadway, where we will still continue to manufacture the largest and best line of Dog Collars and Furnishings to be found in the world.

MEDFORD FANCY GOODS CO.,

207 Broadway, New York.

Send for Catalogue of 1886, issued on the 15th of January.

To Capitalists and Manufacturers.

For Sale as a whole or in parts to suit, in Westmoreland County, Pa., in and adjoining the Borough of Parnassus, 18 miles from Union Depot, Pittsburgh, 350 acres; over two-thirds level river bottom above highest water; remaining beautiful residence sites, equally divided by Allegheny Valley Railway; 300 yards from Tarentum gas pipes; 10-foot vein of coal under all, and gas rises along the whole seven-eighths of a mile on river front. For descriptive circulars, address JAS. W. DRAPE & CO., Pittsburgh, Pa. or ALEXANDER YOUNG, Parnassus, Pa.

SCRAP

WANTED Steel and Iron Scrap, Rails, Tires, Axles Turnings, Borings, Malleable and Burnt Iron, &c.

SCOTT & SMEDLEY,
485 Walnut street, PHILADELPHIA, PA.
Dealers in every description of Iron and Steel.

WANTED.

A thorough business man with capital to join the advertisers in forming a Joint Stock Corporation for the purpose of manufacturing a valuable hardware specialty thoroughly covered by patents. They have a fine manufacturing property well located on the Connecticut River, close to rail and water communication; factory large and well supplied with Power, Tools and Machinery. A party to furnish the working capital and manage the financial part of the business would complete arrangements for a large and very profitable business. Any one seriously intending business will please address "A.," Lock Drawer No. 2, Post Office, Hartford, Conn.

WANTED.—A position in the Iron, Steel, Heavy and Carriage Hardware Business as Salesman by a gentleman who has traveled ten years and who is well and favorably known to the leading buyers and consumers in every State; is energetic, reliable and understands thoroughly the Crucible and Low Carbon Steels, Carriage Springs and Axles, Merchant Iron and Nails; most unexceptionable references; is also an expert bookkeeper. Address "MARION,"
Office of *The Iron Age*, 83 Reade St., New York.

SITUATION WANTED.—As Pattern Fitter by a thoroughly competent man for either Grey or Malleable. Is a first-class man in every respect. Address JOHN BLANCHARD,
No. 203 Vail Ave., Troy, N. Y.

WANTED.—By a young man with five years' experience in the Hardware business, a position as Clerk in Hardware store; can give unquestionable reference.
Address Post Office Box 124,
Lewistown, Penna.

WANTED.—A situation as Superintendent, Manager or Foreman of an Iron or Brass manufacturing concern; an experienced practical mechanic in the manufacture of Engines, Presses, Dies and General Machinery; also Chandler, Kerosene Lamp and Brass Work; there had successful experience in the management of shops and hands. Can furnish good reference in all particulars. Address "L.,"
P. O. Box 410, Boston, Mass.

Special Notices.

SECOND-HAND MACHINERY

In Good Order. For Sale Cheap.

1 Engine Lathe, 48 in. x 20 ft. bed.
1 " " 36 in. x 18 ft. "
1 " " 30 in. x 10 ft. "
1 " " 28 in. x 20 ft. " Pond.
1 " " 24 in. x 12 ft. " Field.
1 " " 20 in. x 8 and 10 ft. bed. Putnam.
1 " " 17 in. x 8 ft. bed.
1 " " 15 in. x 6 ft. Porter. Rod feed only.
1 " " 15 in. x 6 ft. Plaster, with turret.
1 Planer, 50 in. x 30 in. x 17 ft.
1 " " 20 in. x 20 in. x 4 ft.
1 " " 36 in. x 36 in. x 7 ft.
1 " " 32 in. x 30 in. x 9 ft.
1 " " 17 in. x 17 in. x 3 ft.
1 Shaper each 50 in. x 24 in. stroke.
120 in. Plain Drill.
1 Lincoln Pat. No. 2 Miller.
1 each 3, 4 and 6 Spindle, No. 0 Drills, P. & W. Co.
1 No. 2 Screw Machine. Wire feed. Pratt & Whitney.
1 16-in. Stroke Crank Planer.
1 10 H.-P. Vertical Engine and Boiler.
1 375-lb. Drop Hammer, Beecher & Peck.
1 40-lb. Trip Hammer.
1 12 in. Weston Electro-Plating Machine.
1 No. 3 Stiles Press.
1 Foot Presses.
1 Return Tubular Boilers, 16 ft. x 48 in.
1 Vertical " 54 in. x 8 ft.
1 Holsting Engines, 8 and 10 H.-P.
1 No. 2 Hand Milling. Fruit & Whitney.
1 Cutter Grinder, Pratt & Whitney.
1 15-in. stroke Shaper. Hindey.
1 No. 30 Presses. Bliss.
Also full line of New Machinery.
New York Agency TAYLOR MFG. CO., Engines, Boilers, &c. Correspondence solicited.
PRENTISS TOOL AND SUPPLY CO.,
P. O. Box 336a. No. 42 Dey St., New York City.

FOR SALE.

A Valuable Rolling Mill and Wharf Property

On Delaware ave. above Poplar St., now occupied by the Philadelphia Iron and Steel Co., having a frontage on Delaware avenue of 25 feet and extending eastwardly in parallel lines to Delaware River about 500 feet; Pier 65 feet wide and about 200 feet long, with two docks respectively 75 and 50 feet. The pier is within 10 feet to the Warren's line. On the property there is a very valuable Rolling Mill now running, embracing Puddling Train, squeezer, one 18-in. Train, one 24-in. Train, two 6-in. Trains, with three (double) Puddling Furnaces and one single, with Boilers, Heating Furnaces, Shears, Engines, Scales, with rolls to make angles and Tees up to 4 inches, and Flats up to 8 inches, and Rounds to 3 1/2, and many shapes of different kinds; also Universal Mill. We would particularly call attention of capitalists to this property. The wharf property will be sold separate from the machinery, if so desired; a portion of the purchase money can remain. For further information inquire on the premises.
JOHN H. BRINGHURST, Pres't. 239 North Delaware Av.

FOR SALE CHEAP.

One "Strange" self-feeding and self-setting Barrel and Hoghead Stave Machine, 20-in. saw, 36-in. stave, nearly new; cost over \$450 and will sell it for \$240, cash; owner died and no use for it in this section. Also Portable and Stationary Steam Engines, Boilers, and the Eclipse Fan Blower, Tire Benders, and small Engines.
Address EZRA F. LANDIS,
Lancaster, Pa.

ENGLISH PLANER

For Sale.

Will plane 4 feet square and 12 feet long. Double Head. But little used.
STILES & PARKER PRESS CO.,
Middletown, Conn.

For Sale or Exchange

FOR FARM PROPERTY.

Hardware stock of about \$5000, with good-will, in Milton, Pa. Goods in first-class condition. Reason, retiring from business.
Address EDMUND DAVIS,
Milton, Pa.

DAMAGED

BAND AND ROD IRON

For sale by

DAN'L W. RICHARDS & CO.,
88 to 96 Maugin Street, New York.

WANTED.—Position by Chemist; would prefer to have charge of Furnace in connection with duties in laboratory. Have practical experience in making all grades of Open-Hearth Steel. Also mixes for Special Soft and Tool. Address "METALLURGICAL CHEMIST,"
Office of *The Iron Age*, 77 4th Av., Pittsburgh, Pa.

For Sale.

The entire plant of the Easton Lock Works, consisting of machinery, tools, &c., used in the manufacture of Locks and Knobs, together with all patterns, dies, &c. Inquire of
HESS BROS.,
Easton, Pa.

FOR SALE.

An old-established wholesale and retail Iron and Steel and Heavy Hardware business, with unexpired lease of store, stockhouse and dock, in a manufacturing city of 40,000 inhabitants. Can load and unload direct from cars to storehouse or from boat. Reason for selling, poor health. A good paying business for the right party.
Address "C. & P."
Office of *The Iron Age*, 83 Reade St., New York.

FOR SALE.

VERTICAL CONDENSING ENGINE,

54 in. diam. of cylinder x 48 in. stroke

VARIABLE CUT-OFF.

50-Ton Band Wheel,

20-ft. diam. x 60 in. face

At a great sacrifice.
Engines, 4 to 100 H.-P. 10 H.-P. Baxter Engine. Worthington Pump. Sturtevant Blowers, Nos. 8 and 38. Hydraulic Presses and Pump. Five Upright Boilers, 60 Horse Power, 100 lbs. pressure, &c.
MARVIN BRIGGS, 69 Rutgers St., cor. Water.

MANUFACTURERS of Builders' Hardware, Mechanics' Tools, Nails, Specialties or kindred lines, wanting to be represented before the first-class trade of Missouri, Kansas, Nebraska and Iowa, in a safe and inexpensive way, by a responsible Salesman with an established trade, who can give business references or security, will find it to their interest to address
WM. ARLINGTON, Kansas City, Mo.

WANTED.

By a young man, an experienced Chemist, who has been connected with Mines, Blast Furnaces and Steel Plants, a "Mill Job." Timeskeeper, Fuel Hand, Asst. Supt. or the like. Address "MILL JOB,"
Office of *The Iron Age*, 83 Reade St., New York.

Special Notices.

MACHINERY.

SECOND-HAND, A1 ORDER.

Brown & Sharpe Universal Miller. Large and small.
Pratt & Whitney No. 2 Miller. Lincoln Pattern.
" " Marking Machine.
" " Screw Machine No. 3. B'k Gear.
" " Engine Lathe, 15 in. x 5 ft. Taper.
" " " 16 in. x 5 ft. Taper.
Putnam Engine Lathes, 17 in. x 6 1/2 ft. No screw.
Rod feed only.
Pond Engine Lathe, 16 in. x 7 ft. Complete.
Harrington " 16 in. x 6 ft. "
Lincoln " 17 in. x 8 ft. "
Bridgeport " 16 in. x 8 ft. "
New Haven " 18 in. x 8 1/2 ft. "
Rowland " 21 in. x 12 ft. "
Ames " 20 in. x 10 ft. "
Pond " 20 in. x 10 ft. "
Blaisdell " 26 in. x 12 ft. "
Perkins " 26 in. x 16 ft. "
Putnam " 42 in. x 16 ft. Rod feed only.
Saunders' 8-inch Pipe-Threading Machine, patent dies. Good as new.
20 in. x 4 ft. Planer. New Haven.
26 in. x 6 ft. " Hendey.
36 in. x 12 ft. " Niles.
42 in. x 12 ft. " N. Y. S. E. Co.
30 in. Drill. Prentiss, nearly new.
No. 3. Stiles Punch Press.

Bolt Cutters, Milling Machines, Drills, Shapers, Lathes, Planers, &c., new, and also a line of second-hand machines not mentioned above. State what you want to buy, and we will be glad to correspond with you.
Call and see us.

E. P. BULLARD,

14 Dey Street, New York.

MEYER, KINGSLAND & CO.,

Wholesale Auctioneers,

No. 10 Warren St., New York.

Regular sales of Hardware, Cutlery, &c. Sales cashed promptly. Consignments of goods solicited.

FOR SALE.

Merchantable Hoops, 1 1/2 x No. 16 and No. 17, and 1 1/2 x No. 17, in lengths from 2 to 5 feet.

A. R. WHITNEY & CO.

P. O. Box No. 33, New York City.

E. BISSELL & CO.,

Wholesale

HARDWARE AUCTIONEERS,

83 Chambers and 65 Reade Sts., New York.
Sales held weekly for the trade. Consignments solicited. We refer to the leading manufacturers and importers.

Cotton Gin Ribs.

HARDWARE MERCHANTS

and others furnished with materials of all kinds for making and repairing COTTON GINS, RIBS and SAWS for repairing ALL makes of gins. Send for Price List. Address THE BROWN COTTON GIN CO., Manufacturers of Cotton Gins Feeders and Condensers, New London, Conn.

Vulcan Works, Baltimore, Md.

This old-established Foundry and Machine Shop for sale or lease. Has a complete equipment in all departments. Tools for sale. Send for catalogue. Address as above.

FOR SALE

BY

WILLIAM SELLERS & CO.

We offer for sale eight Swing Cranes, running from 10 to 50 tons capacity. One of the 50-ton Cranes is driven by steam and geared so as to raise or lower the load and run it in or out and swing the rib simultaneously. The Cranes are in good order. We are taking them out of our foundry to make room for a high-speed power Traveling Crane we have just designed and built. For further information, address
WM. SELLERS & CO., Philadelphia.

FOR SALE.

Large lot second-hand Iron Tanks, from 5000 gals. down, all sizes and shapes.
Large lot new Mule Shoes.
Large lot new 100 gal. Oil Tanks.
Three very large Cast Iron Kettles suitable for soap or chemical use.

50 tons Red Brass. 500 tons Wrought Scrap Iron.
BUSSENIUS, CUNLIFFE & CO.,
15th and Washington ave., Philadelphia,
Dealers in Scrap Iron and Old Metals.

FOR RENT.

A valuable mill property located in Philadelphia with business thirty years' established; both Water and Steam Power attached.
Address BOX No. 706,
Philadelphia Post Office.

SCRAP IRON.

We buy all kinds of Iron and Steel Scrap, Burnt Iron, Old Rails, &c., &c. Write us, naming quantity, price, &c.

Trade Report.

New York Iron Market.

American Pig.—The opinion advanced in our last issue that prices would be fixed at \$16, \$17 and \$18 has been verified, the announcement having been made openly soon after we went to press. It is regarded from widely different standpoints by those in the trade. The motives which prompted placing prices on so moderate a level are avowedly to keep Southern and Scotch Irons out of this market, and to discourage the blowing in of an additional number of furnaces in the Schuylkill and Lehigh valleys. The conservative element in the trade applaud the move as wise and judicious. Some furnacemen disagree with this opinion, holding that higher prices would have been obtained for the asking. Others are probably dissatisfied with it because they had hoped that had a higher level been established they would have found it an easy matter to book orders at a concession. Consumers would look upon it with varying sentiments. Some appear to be ready to accept the terms as probably the best attainable for the year, and the usual reports of large sales are put forth. Others seem content to take their chances for summer delivery, arguing that later on they may do better. They argue that a number of furnaces have already gone in who may be counted upon to be eager sellers a few months from now. On the other hand, we know that there are buyers who, though they have requirements covered for the next 90 days, will closely watch the market to contract for summer delivery whenever the slightest sign of weakness appears. They openly express their belief that Pig Iron will be higher. Some furnacemen hold the same views and are loth to enter into long-time contracts. They profess to be willing to let others fill up at present prices, feeling that they will realize more by waiting. While, therefore, the majority both of sellers and of buyers approve of the action taken, there are quite a number in the trade who hold different views. That the prices are unexpectedly low to some furnacemen is evidenced by the announcement of the Chickies Iron Co. that they have restored their figures to \$18 for No. 1, \$17 for No. 2 and \$16 for Gray Forge. We quote for Standard brands, tidewater delivery, \$18 @ \$18.50 for No. 1 X Foundry, \$17 @ \$17.50 for No. 2 X Foundry, and \$16 @ \$16.50 for Gray Forge. Outside brands are 50¢ below these quotations.

Scotch Pig.—The market is dull and unchanged. The low prices of American Pig Iron are not calculated to encourage importations. We quote nominally as follows for small lots: Coltness, \$20.50 @ \$21 to arrive; Gartsherrie, \$20 @ \$20.50 to arrive; Shotts, \$20.50 @ \$21 to arrive; Carnbroe and Glengarnock, \$19.50 to arrive; Summerlee, \$20 @ \$20.50 to arrive; Dalmellington, \$19 @ \$19.50 to arrive; Eglington, \$18 @ \$18.50 to arrive, and Clyde, \$18.50 @ \$19 to arrive.

Bessemer Pig.—There is very little doing. Buyers' and sellers' views are too far apart for business. We hear that \$19.50 has been offered for a block of 10,000 tons of Foreign, but declined. We quote, \$20 @ \$20.50, nominally.

Spiegeleisen.—No business is reported this week, and prices remain nominally \$28 for 20 %; \$32 @ \$32.50 for 30 % Spiegeleisen, and \$67 for 80 % Ferromanganese.

Bar Iron.—The market is stiffer. We hear of sales of round lots of Common Iron on dock at 1.55¢ @ 1.60¢, and of higher prices realized for Refined Iron of well-known brands. The advance in Old Material has caught the very mills which are usually the lowest sellers in this market, since they have been buyers of Old Rails only from hand to mouth, while the larger mills are well stocked. A meeting of the Bar-Iron manufacturers is to be held in Philadelphia at an early date, with the avowed object of advancing prices. Such a movement, if judiciously guided, seems to have in it the elements of success, though it would be a grave error to attempt to do too much at once. We quote for delivery here in round lots: Common Iron, 1.55¢ @ 1.60¢; Medium, 1.60¢ @ 1.75¢, and Refined Iron, 1.80¢ @ 1.90¢, with half extras. Store prices are 1.75¢ @ 1.80¢ for Common, 1.80¢ @ 1.90¢ for Medium, and 1.95¢ @ 2¢ for Refined.

Structural Iron.—The event of the week has been the placing of the contract for the Omaha Bridge of the Union Pacific, at figures which are lower than any yet known, the Union Bridge Co. being the lowest bidder. This proves that as yet, for desirable orders in large quantities, there has not been any advance on Structural Iron. We quote Angles 1.05¢ @ 2¢, delivered, and Tees at 2.25¢ @ 2.35¢ for round lots. Steel Angles are quoted 2.35¢ @ 2.45¢, according to quality. Store quotations remain 2.2¢ @ 2.4¢ for Angles, and 2.5¢ @ 2.7¢ for Tees. American Beams and Channels are 3¢ base from dock for all orders.

Plates.—Those mills known for the high quality of their product are asking more money, but as yet no general advance has been established. We quote for round lots: Common or Tank, 2¢ @ 2.1¢; Refined, 2½¢ @ 2½¢; Shell, 2.4¢ @ 2½¢; Flange, 3.4¢ @ 3½¢; Extra Flange, 4¢ @ 4½¢. For small

lots of Steel Plates the quotations are as follows: Ship, 3¢ on dock; Tank, 2½¢ on dock; Boiler, 3¢ @ 3¼¢ for Shell, 3½¢ @ 4¢ for Flange, and 4¢ @ 5½¢ for Extra Flange and Fire-Box.

Merchant Steel.—Associated Press dispatches allude to the meeting referred to in our last issue, placing the date of the gathering at January 7th. Quotations for the range from ordinary to good grades are as follows: American Tool Steel, 7½¢ @ 10¢; Tool Steel of special grades and finer qualities, 12¢ @ 20¢; English Tool, 13½¢ @ 15½¢; Common grades, 7¢ @ 9¢; Crucible Machinery, 4.5¢ @ 6¢; Spring and Tire, 2½¢ @ 2¾¢; Open-Hearth Machinery, 2½¢ @ 2¾¢, and Bessemer Machinery, 2¢ @ 2½¢.

Steel Rails.—There are rumors of large sales, aggregating 40,000 tons in all, East and West. The only transaction of which anything definite is known is the sale of 10,000 tons to the Union Pacific, by the Cleveland Rolling Mill Co., at private terms. The market is firm, the majority of the mills asking \$35. Few of them are in shape to fill the early delivery which buyers usually demand. It is reported that the Western Steel Co., lessees of the old Vulcan Mill, at St. Louis, have been offered an allotment by the Board of Control of 60,000 tons. The capacity of the Rail mills has become the subject of a controversy in the columns of the Times, between Mr. Andrew Carnegie and Hon. Abram S. Hewitt. The former holds that the producing capacity of the mills is not now greater than it was in 1882, when the product was 1,284,000 gross tons, while Mr. Hewitt places it at 2,000,000 tons, presumably net tons, or, roughly, 1,700,000 gross tons. Mr. Carnegie argues that there can be no growth in the Rail capacity, because now a much larger quantity of ingots is used for other purposes. While it is true that the use of Steel for structural and other purposes has grown rapidly, it must not be forgotten that a number of new plants have been built to fill that demand. Some of the older mills are paying less attention to Rails than they did formerly, but it is not too much to say that the works of the Scranton Steel Co., with their phenomenal capacity for so small a pair of converters, largely counterbalances this. Then every old plant in the country has been either remodeled or has been improved by new machinery. There is stimulus enough in \$35 for Rails to drive all but two or three to full capacity if the market should call for it. Therefore Mr. Carnegie's estimate seems certainly too low, while that of Mr. Hewitt is evidently too high. The truth probably lies between the two, and 1,500,000 gross tons may be accepted as a fair estimate of capacity at present figures.

Steel Wire Rods.—There is little doing. We hear of a sale of 1000 tons at \$41.50. We quote nominally \$42 @ \$42.50.

Old Rails.—Two steamers have this week arrived with about 1200 tons of English Double-Head Rails, which were freely offered previous to arrival, but found no buyers, and were ordered into store. Other lots are known to be on the way. They are freely offered at \$22.50, ex-steamers. The Boston syndicate, which has purchased heavily during the past month, appear to be ready to take only Rails made by New England and Troy mills. We hear of one sale of 1500 tons of American Tees, f.o.b. at Eastern port, at private terms, and of two lots aggregating about 800 tons at \$20, delivered at New York. The market has been disturbed by the arrival of the English Rails referred to and by offerings of some round blocks of American Rails. It appears now that the movements of the Boston syndicate have almost exclusive reference to that market, which will only take a few specified brands of American Rails, consumers in New England evidently not caring to touch others.

Scrap.—Holders continue to ask \$19 @ \$20 from yard for No. 1 Wrought.

Rail Fastenings.—We quote 2.25¢ for Spikes, 2.75¢ for Bolts and Square Nuts, 2.9¢ @ 3¢ for Bolts and Hexagon Nuts, and 1.7¢ @ 1.75¢ for Splice Bars.

Metal Exchange.

The following transactions are reported to have taken place on the floor of the Metal Exchange:

WEDNESDAY, December 30.
300 tons Pig Iron Certificates, March \$18.12½
THURSDAY, December 31.
600 tons Pig Iron Certificates, March 18.12½

Philadelphia.

Office of The Iron Age, 250 South Fourth St., PHILADELPHIA, January 5, 1886.

Pig Iron.—The year opens on a firm, but somewhat irregular, market, although, on the whole, the tendency is toward higher figures. The action of the Thomas Iron Co. in fixing the price of No. 1 X at \$18 at tide has given a slight check to the market for the time being, but if nothing unforeseen occurs prices are still likely to work toward higher figures. This statement is based on the evident feeling among both consumers and producers, and also upon the very limited supply of Iron that is being offered for sale. If other companies were soliciting business even at \$18.50 or \$19 there might be room for suspicion that prices would not hold, but, so far as this market is concerned, the tendency is just the reverse, and, although good brands of No. 1 X can be picked up at \$18.50 @ \$19, they are certainly not going

a begging at these figures. There is quite a possibility that prices may have reached their highest limit for their present, but the chances appear to be that the Thomas Iron Co., large producers as they are, will have to sell another 50,000 tons, perhaps more than that, before buyers show signs of repulsion. In point of fact, it is stated and very generally believed that they (the T. I. Co.) are not by any means anxious for business at their own prices, and discriminate very closely when anything of importance is offered to them. Still the increase in production is assuming large proportions, and, in spite of the general improvement in business, it is good policy to go slow and wait developments. If the present rate of production proves to be equal to consumption the Thomas Iron Co. have done a good thing in trying to prevent too rapid an advance, not only for themselves, but for the trade at large; but, if they have underestimated the market, so much the better for customers who have taken the Iron, while leaving their competitors to secure orders at whatever advance the market may afford. In this connection it should be stated that the company above named have advanced the price of their other grades \$1 ⅞ ton, and, as a good deal of their No. 1 X was sold at \$17.50 during the summer months, the advance averaged on their entire product is not far from \$1 ⅞ ton. A considerable amount of business has been done during the past four or five days, and there are still a great many orders waiting to be placed. Prices, as we have said, are very irregular, and, although \$16, \$17 and \$18 at tide are the Thomas Iron Co.'s prices, a very large proportion of the business done has been at higher figures. Other good brands are held at from 50¢ to \$1 ⅞ ton more money, and it is only once in a while that a seller will meet the Thomas Iron Co.'s prices. A fair average of the market would be \$16.25 @ \$16.50 for Gray Forge, \$17 @ \$17.50 for No. 2 X, and \$18.50 @ \$19 for No. 1 X, with still higher prices for special brands. At this writing the market may be called irregular, but firm, with a good inquiry and light offerings.

Foreign Iron.—There is nothing doing, the high prices asked making it impossible to do business. Bessemer, \$20 @ \$20.50; 20 % Spiegl, \$29; holders firm.

Muck Bars.—The market is very active, and prices are higher. Large sales have been made at \$28 @ \$28.50 at mill; \$29 @ \$29.50 now asked, and no disposition to make concessions.

Blooms.—There is rather more inquiry, and sellers are inclined to ask an advance. Latest sales (per Bloom ton, delivered) as follows: Charcoal Blooms, \$51 @ \$52; Run-out Anthracite, \$41 @ \$42; Scrap Blooms, \$32 @ \$33, and Ore Blooms, \$33 @ \$34.

Bar Iron.—There is a decided improvement in the demand, and prospects of a very considerable business being done within a few days. Orders are offered from a variety of sources, carbuilders showing more interest in the market than they have done for months past. Without any specially large lots actually closed, the feeling is strong, and confidence that prices can be maintained appears to be steadily growing. The usual rates are 1.8¢ @ 1.85¢ for Best Refined Bars, and 1.65¢ @ 1.7¢ for medium quality.

Plate and Tank Iron.—There is a fair demand for Plates, but as the mills are all pretty well employed the disposition is to advance prices, although in an irregular and somewhat spasmodic way. Consumers find it impossible to duplicate orders placed during last month, so that prices may be fairly quoted about a tenth higher, although in some cases a still greater advance is asked. In ordinary cases prices are about as follows: Ordinary Plate, 2¢ @ 2.1¢; Tank, 2.1¢ @ 2.2¢; Shell, 2.5¢; Flange, 3.5¢; Fire-Box, 4.25¢; Steel Plates, Shell, 3.25¢; Flange, 3.5¢; Fire-Box, 4¢.

Structural Iron.—In sympathy with other departments the feeling is firmer, and prices probably a tenth higher, although in special cases orders may have been taken at only a very slight advance on recent quotations. Still, in view of the generally improved outlook for business, sellers show a strong front, and quote firmly at about the following prices: 2¢ @ 2.05¢ for Angles; 2.1¢ @ 2.2¢ for Bridge Plate; 2.4¢ @ 2.5¢ for Tees, and 3¢ for Beams and Channels.

Sheet Iron.—There is a good demand for Sheet Iron, considering the season, but as yet no change in prices has been made, although the impression is almost universal that an advance is only a question of a very short time. Meanwhile quotations are firm, as follows:
Best Refined, Nos. 26, 27 and 28 4 ¢
Best Refined, Nos. 18 to 25 3½ ¢
Common, 14¢ to less than the above 3 ¢
Best Bloom Sheets, Nos. 26 to 28 5 ¢
Best Bloom Sheets, Nos. 22 to 25 4½ ¢
Best Bloom Sheets, Nos. 16 to 21 4 ¢
Blue Annealed 3 ¢
Best Bloom, Galvanized, discount 57½ ¢
Common, discount 62½ ¢

Wrought-Iron Pipe.—Stocks continue well sold up and the demand holds on very satisfactorily. Prices remain firm and do not seem likely to change in the very near future. Quotations for large lots are about as follows: Lap-Welded Black, 60 %; Butt-Welded Black, 42½ %; Butt-Welded Galvanized, 32½ %; Lap-Welded Galvanized, 42½ %; Boiler Tubes, 55 %.

Nails.—Being fairly between seasons, the market is naturally dull; few sales are made and only in small lots. Prices, however, are firm and well maintained at \$2.65, and there is no indication of a break from that figure in this market.

Steel Rails.—Prices are again a shade higher, \$34.50 @ \$35 at mill being an inside figure, with several sales on that basis. There is still a large number of inquiries, and prospects are about as favorable as before, probably more favorable, as there is more business coming on the market than was anticipated. The mills have almost as much business as they care to have, but are desirous of meeting all legitimate demands, so far as they are able to do it; hence, while not seeking business, they enter liberally at the prices above named, hoping that other branches will catch up before any further advance is made in Rails. Referring to a statement that is going the rounds of the papers, Mr. Felton, of the Pennsylvania Steel Co., says that they originally hammered all their Rails, but as the difference in cost was \$2 to \$3 ⅞ ton beyond the blooming process, and so few were willing to pay the difference in price, they finally abandoned the hammering some seven years ago. They are still prepared to hammer Rails on the old process, providing they can obtain the difference in cost, now estimated at about \$5 ⅞ ton, so that there is no necessity for buyers going abroad to get hammered Rails.

Old Rails.—There is quite an active demand, but there are none here, although \$21 would be paid for spot lots. Sales at interior points at prices varying from \$21.50 to \$23.

Scrap Iron.—The supply is limited, and prices are very firm at about the following figures: No. 1 Wrought Scrap, \$18.50 @ \$19.50; No. 2 do., \$12.50 @ \$13.50; Horse Shoes, \$22 @ \$23; Turnings, \$13 @ \$14; Old Car Wheels, \$15 @ \$16; Old Steel Rails, \$17; Fish Plates, \$23 @ \$23.50; Cast Scrap, \$13.50 @ \$14; do. Turnings, \$10 @ \$10.50.

Chattanooga.

Office of The Iron Age, Carter and Ninth Sts., CHATTANOOGA, January 4, 1886.

Many who have been looking forward to the inauguration of the new year as a time when business as well as prices would take an upward turn have been disappointed so far; the truth is, too much has been expected. The impetus that was given to the Iron trade a few weeks ago was looked upon as a sure indication that it would also carry with it all kinds of business, but that expectation has not as yet been fully realized. Nevertheless the business situation of the South is becoming more and more favorable to all legitimate and economically conducted enterprises, and the outlook in all lines of trade is encouraging.

Pig Iron.—This important article is quiet; that is to say, there is not the animation and speculative opinions about the future that were so freely expressed toward the close of the year, but prices appear to have settled down to a basis of the figures that ruled during the last two weeks in December. Some large sales have been made at these prices, and it is the general opinion now that they will prevail for a few weeks at least. Upon the whole, the situation is certainly not discouraging. There are none who entertain the opinion that prices will retrograde, but many who look forward to better prices as the year advances. There will certainly be a much greater consumption of Pig Iron in the South in the future than there has been in the past, and the South is fast becoming quite an important market to Southern furnaces. The manufacture of Sad-Irons, Sash Weights and many such simple articles that are entirely made from Iron, and which are being transported into Northern markets at about Pig-Iron rates, is attracting considerable attention, and a number of new enterprises are locating with the object of going into such like business.

Hardware.—The demand for Bar Iron has been very active and prices have stiffened up from one-tenth to two-tenths, \$1.70 being now the ruling figure for carload lots. All kinds of Building-Ware is in good demand and likely to continue so, as the amount of new buildings going up was never greater than at present.

Birmingham.

BIRMINGHAM, Ala., January 4, 1886.

The new year finds this district in a very comfortable condition. General business does not afford much of an index on this point, it is true, for there is hardly anything doing between large dealers and their customers besides settling, most of the drummers being at home still, but because the prospect for the great mineral staples is good everything else looks cheerful. With the leading retailers here business still comes remarkably close to ante-Christmas figures, whether the stimulus is accidental or comes from fundamental conditions.

Pig Iron.—Is still the chief beneficiary of the improved condition of the Iron trade. At most of the furnaces its materials are no higher, while the product readily brings as good prices as it has brought for the last month. About all that is to be said for the market, indeed, is that it is firm at last week's quotations. The conspicuous feature of the trade here just now is the active preparation for big business. Everybody is doing his utmost to satisfy old orders. Forty carloads of Iron left one of the furnaces the last day of the old year, after a good rate of shipment all through Christmas week. There is probably less Iron sold ahead hereabouts now than has been for some time, a state of things that is not distressing manufacturers. Anyhow, one con-

cern that was practically out of the market before Iron advanced is just now in again, except on two grades. A well-posted master predicts another advance the latter part of this month.

Finished Iron.—The rolling mills are at last getting a shade better prices for their product, but on a very irregular market. In the last few days, indeed, on certain items they have encountered lower quotations than ever from Northern and Western competitors. It certainly seems that the trade at large is afraid to attempt any systematic advance of prices, and altogether Finished Iron offers a decidedly more promising aspect for the bull speculator than Pig Iron.

Nails.—Are fairly firm at last week's figures, with the other conditions of the market about the same. This means, in part, that they do not promise an early advance.

Cast Pipe.—This is another commodity that might naturally have been expected to bring considerably better prices by this time, but which continues to disappoint expectation. The demand at this place is good enough, and it would seem from the inquiries that the makers elsewhere have their hands full of business, too.

Miscellaneous.—Work at the foundries and machine shops has little more than started again since the holidays, but some of them have booked some good business. This is especially true with reference to certain structural specialties that will naturally be wanted for house-building in the spring. An order has just been placed by a big coal concern for the largest steam pump ever made here.

Iron Ore.—The Ore business wears a somewhat brighter look, although Pig Iron has not yet helped it any in the matter of prices, in this district at least. At Attalla, between here and Chattanooga, it seems that Ore is up some 10¢ ⅞ ton. Some inquiries that promise big contracts have come here in the last few days, some of which portend another new furnace, of which there have been whispers for some time.

Cincinnati.

JANUARY 4, 1886.

Pig Iron.—The usual demand for carlots from consumers and for immediate delivery at going prices covers the situation. It is thought that the furnaces in the West and South will be abundantly able to furnish consumers with all the Iron they need, and at prices not much advanced on present quotations:

| CHARCOAL FOUNDRY. | | | |
|---|-----------|-------|--|
| Hanging Rock, Best, No. 1, 4 mos. | \$20.50 @ | 21.50 | |
| Hanging Rock, Good, No. 1, 4 mos. | 20.00 @ | 20.00 | |
| Hanging Rock, Good, No. 2, 4 mos. | 19.00 @ | 20.00 | |
| Tennessee, Alabama and Georgia, No. 1, 4 mos. | 18.00 @ | 18.50 | |
| Tennessee, Alabama and Georgia, No. 2 | 17.00 @ | | |
| COKE FOUNDRY. | | | |
| Southern No. 1, 4 mos. | 18.00 @ | 18.50 | |
| Southern No. 2, 4 mos. | 17.00 @ | 17.50 | |
| Ohio and West Pennsylvania, No. 1, 4 mos. | 18.00 @ | 19.00 | |
| Ohio and West Pennsylvania, No. 2, 4 mos. | 17.00 @ | 17.50 | |
| SILVER-GRAY SOFTENERS. | | | |
| Hanging Rock (Jackson County), No. 1, 4 mos. | 19.00 @ | | |
| Hanging Rock (Jackson County), No. 2, 4 mos. | 18.00 @ | | |
| Hanging Rock (Jackson County), No. 3, 4 mos. | 16.00 @ | 16.50 | |
| Other makes and grades | 15.00 @ | 17.00 | |
| CAR WHEEL. | | | |
| Hanging Rock Cold-Blast | 25.00 @ | 26.00 | |
| Hanging Rock Warm-Blast | 19.00 @ | 20.00 | |
| Southern Warm-Blast | 18.00 @ | 20.00 | |
| Southern Standard Warm-Blast | 25.00 @ | 25.00 | |
| Georgia Cold-Blast | 25.00 @ | | |
| FORGE. | | | |
| Stonecoal and Coke | 14.50 @ | 17.00 | |
| Charcoal | 17.00 @ | 19.00 | |
| SCRAP. | | | |
| Rails | 19.00 @ | | |
| Wheels | 15.00 @ | 16.00 | |
| Range of Wrought, @ 100 lb. | .60 @ | .75 | |
| Cast, @ 100 lb. | .35 @ | .60 | |

No sales Scrap reported. Quotations on Pig Iron as above are f.o.b. here, or less the freight to Cincinnati if orders are filled direct from furnaces; 50¢ ⅞ ton discount from time prices for cash.

Louisville.

W. B. BELKNAP & Co., Louisville, under date of January 4, report as follows: The Iron market holds its own with commendable firmness. There are no indications of weakening in any quarter, and we are assured that the promises made for better figures early in the year still hold good. The mills at Pittsburgh and along the river seem to be more generally occupied than for years past. The holidays, of course, have reduced the general volume of wholesale business; at the same time they have had no depressing influences such as to shake one's faith in the future. The reports from all over the country of improvement, clearing-house exchanges, of reduction in failures, and notably so in the amounts involved, the promise of development in various ways, in railroads and other constructions, lend color to the views of the optimists.

Bar Iron.—The mills will be busy this month on contracts taken in December and on new business coming in for January delivery. Agricultural implement concerns hereabouts are running very full, turning out unusually large product, and we presume similar factories are doing likewise in other parts of the country. The "increased cost of material" cuts an important figure in all the circulars that we now get from the manufacturers, and, if there is anything in warnings, we anticipate an active market in the near future.

Steel.—There is a good deal of Agricultural Steel selling; also the ordinary grades for Tire and Machinery purposes, Pointing Plows, &c. The lower grades have maintained their advance well. There has been no attempt to put up the price of Cast Steel.

Nails.—There is the greatest diversity of opinion possible upon the outlook of Nails,

The shipbuilding industry in Maine, as reported by the Boston *Journal*, has decreased from 46,401 tons in 1884 to 23,053 tons in 1885. There has also been a great change in the character of vessels built during the past year, the majority being 100 tons, and designed for coasting trade, instead of from 500 to 800 tons, as in former years. The vessels built during 1885 were 5 steamers, 5 ships, 1 bark, 3 barkentines, 35 schooners and 5 sloops—total, 57. The outlook for next year is not more encouraging than a year ago, yet a change for the better may occur quite unexpectedly.

General Hardware.

BARB WIRE.

NAILS.

SCREWS

BRASS KETTLES

THE STANLEY RULE AND LEVEL CO.,
 Britain, Conn., and 29 Chambers street,
 New York, under date of January 1, 1866,
 have the following revised discount sheet,
 which applies to their last illustrated cata-
 logue of January 1864. Since that date four
 additional pages (40½, 40½, 38½ and 38½)
 have been issued, the latter two pages ac-
 companying the present discount sheet, a
 description of some of the Tools contained

The following is the revised Shoe Finders' of January 1, 1886, in which, it will be seen, there is made a general advance on former prices, on some few lines the advance being, it will be observed, quite heavy. It will also be noticed that several alterations are made to the lines of goods named. The prices as given below are subject to the usual discount of 10 and 2 per cent.

| | | |
|---|---------|-------|
| 1, Bright, Round Head..... | 75 | are |
| 1, Blued, Flat Head..... | 75 2/10 | price |
| Add 2 1/2 per cent. to net amount of invoice. | | |
| 1, Blued, Round Head..... | 75 | she |

fully represented by illustrations and list
es. They also issue their price list in
et form. Attention is called to the fact

10, 3 $\frac{1}{4}$ and 3 $\frac{1}{2}$ inches only, per 1000..... \$9.00

Brass Shot Shells, First Quality.—Dis. 70¢.
No. 10, 2½ and 2¾ inches, per 100..... \$10.00
No. 12, 2½ inches, per 100..... 10.00

Brass Shot Shells, X Quality.—Dis. 75¢.
No. 10, 2½ and 2¾ inches, per 100..... \$8.00
No. 12, 2½ inches, per 100..... 8.00

At a recent meeting of The Northwestern Plow and Cultivator Association, which is said to comprise all manufacturers west of the Alleghenies, the following resolutions were adopted:

In view of the recent advance in the price of raw material and the prospect of further advances in the near future,

Resolved, That no further concessions be made in prices other than those already made.

Resolved, That, should there be further advances in raw material, it will be necessary to follow the same by an immediate meeting and advance in the prices of Plows and Cultivators to correspond.

Resolved, That we limit the amount of goods to be made for the spring trade of 1886 to actual orders.

The manufacturers of Tackle Blocks are caused some annoyance and apprehension by the fact that some leading jobbers are selling Blocks at figures lower than the schedule of prices adopted by the association justify. They refer to the measures taken to give regularity to the prices of these goods and protect the different interests as having worked thus far very satisfactorily, and regret to see indications of irregularity. The hope, however, is expressed that these irregular prices will not long be offered.

The Norway Carriage and Tire Bolt Association, which has been in successful operation for one year, held its annual meeting on the 30th ult., in New York. To strengthen the association a money forfeit was agreed upon, also a percentage on sales, to be paid into the treasury monthly. A rebate was voted to be paid the jobbers who purchase a specified amount in a given time. After making a slight advance in price the meeting adjourned.

The Axe manufacturers, who have had repeated conferences of late, are in session to-day, endeavoring to complete the arrangements for regulating the Axe market. At this writing the result of their deliberations is not announced, but from the manner in which the manufacturers regard the matter, and the substantial agreement there is among them, it is thought likely that a strong combination will be formed and the price of Axes be advanced.

The Auburn Mfg. Co., Auburn, N. Y., who are represented here by J. C. McCarty & Co., 97 Chambers street, issue a circular December 29, to the effect that any verbal or written quotations on Steel Goods made by the company or by any of their travelers or agents, and not accepted previous to that date, are annulled. This announcement does not apply to the prices of Malleable Rakes, Wood Goods or Edge Goods.

The manufacturers of Axe, Hammer, Pick and other Handles have made a slight advance in the price of the goods.

The manufacturers of Hoes, Rakes and Forks have recently been in conference and agreed upon an advanced figure as the extreme below which they will not sell the goods. This action has a decided tendency to stiffen the price, but jobbing houses who were pretty well supplied have not generally made any change in their quotations.

The association of the Bolt, Nut and Washer manufacturers, making the better grade of goods named below, quote the following revised and advanced discounts, referring at the same time to the market as firm, with some probability of a further advance:

Machine Bolts.....dis. 75&5¢
Bolt Ends.....dis. 75&5¢
Square Nuts.....84¢ ½ off
Hexagon Nuts.....84¢ ½ off
Washers.....84¢ ½ off
Lag Screws.....dis. 75&10¢

In lots of less than 100 lb of a size ½ & ¾ extra is added to the price of Nuts and Washers, as heretofore.

A joint circular is issued January 2 by J. C. McCarty & Co., 97 Chambers street, New York, agents for L. Coes & Co., and John H. Graham & Co., 113 Chambers street, New York, agents for A. G. Coes & Co., confirming existing prices for Coes' Genuine Screw Wrenches of either make, including L. Coes & Co.'s Knife Handle, at 60 per cent. discount from list. Mechanics' Wrenches made by L. Coes & Co., and similar quality by A. G. Coes & Co., will continue to rate at 10 per cent. less than the Genuine. A special discount of 10 per cent. will be allowed on specified orders for 50 dozen for immediate shipment, terms 90 days, or 3 per cent. discount for cash in 10 days. Parties having purchased the quantity will be entitled to the extra discount on subsequent orders during balance of season ending June 30, but this quantity must be taken from either one or other manufacturer, and includes only the Coes' Genuine Pattern or L. Coes & Co.'s Knife Handle, and not the Mechanics' Wrenches made by L. Coes & Co., or a similar quality made by A. G. Coes & Co., the price of either being 10 per cent. less than the discount, and are subject to the same quantity schedule.

BUSINESS CHANGES.

Announcement is made, under date December 31, 1885, by J. C. McCarty and William H. Littell, who refer to their circular issued April 14, 1885, that the copartnership heretofore existing between them under the firm name of Durrie & McCarty is dissolved by limitation. Either partner will sign in liquidation. Under date January 1, 1886, the same gentlemen give notice that they have formed a copartnership under the firm name of J. C. McCarty & Co., for the

purpose of engaging in the Hardware commission business as successors to the firm of Durrie & McCarty. They express their appreciation of the confidence hitherto reposed in them in their former relations by their principals and the trade.

W. H. Jacobus, who was for some years connected with Sise, Gibson & Co., and Donald McKay, widely known as the representative of the Morris Sash Lock Mfg. Co., which has now become the Ireland Mfg. Co., Cincinnati, Ohio, issue, January 1, a notice of the co-partnership they have formed under the style of W. H. Jacobus & Co., for the purpose of conducting a Hardware business as manufacturers' agents, their office being 90 Chambers street, New York. A full line of such goods as they represent will be carried in stock, but announcement is not yet made concerning the manufacturers whom they will represent.

Announcement is made, January 1, of a partnership between Arthur G. Sherman and William S. Fearing, of this city, under the firm name of Sherman & Fearing, for the transaction of a general domestic and foreign purchasing and commission business. Both these gentlemen have a wide acquaintance with the trade, Mr. Sherman being known as the representative in this market of a number of prominent jobbing houses of the country, and Mr. Fearing from his long connection with Brown & Brothers, Waterbury, Conn., with whom it is understood he will retain his relations, continuing to be their representative in the sale of Brass and Copper. His familiarity with Metals and the Metal market will be of value to the concern, who advise us that they are intending to make a specialty of this line in connection with the purchase of Hardware. As purchasing agents they propose to represent none but the best houses, whom, they advise us, they will bring directly into contact with the manufacturers from whom the goods are bought, and so not come under the head of what are known as syndicate buyers. These gentlemen, who are widely known and have the confidence of the trade, will have the best wishes of all for their success.

We are authorized to announce that the firm of the Morris Sash Lock Mfg. Co., Cincinnati, Ohio, was organized January 1 as a stock company, to be known as the Ireland Mfg. Co., and will continue the manufacture of Builders' Hardware, as heretofore done by the Morris Sash Lock Mfg. Co., at the old stand, 78 to 84 Harrison street, in that city. In announcing this change the Ireland Mfg. Co. respectfully solicit a continuance of the favors of the trade.

The house of John C. Jewett & Sons, Buffalo, N. Y., has become the John C. Jewett Mfg. Co., John C. Jewett retiring, as announced in the following card which appears in the catalogue of the company, just issued:

BUFFALO, JANUARY 2, 1886.

In retiring from this business after an active participation in it for over one-third of a century, the undersigned wishes to return his heartfelt thanks to the long list of customers and friends whose confidence he has so long enjoyed. He also desires to embrace this opportunity to recommend his successors, his two sons and son-in-law, who, having grown up in the business, are thoroughly conversant with every detail thereof and fully able to manage it successfully and to the satisfaction of all concerned.

Of the company thus organized Edgar B. Jewett is president, Risley Tucker secretary, and Frederick A. Jewett, treasurer. In their circular to the trade, referring to the retirement of Mr. Jewett and the consequent change in the organization of the house, the company say:

Referring to the foregoing announcement, we wish to say that the business of manufacturing Refrigerators, Ice Chests, Bird Cages, Water Filters, Water Coolers, Toilet Ware, Coal Vases, &c., will be carried on in future in the same manner and on the same principles as have won for this house such a high reputation during the administration of Mr. John C. Jewett, now retiring. Whatever virtue there may be in honest goods and fair dealing, we claim for us as an inheritance of more actual value in business than a heavy bank account.

They then refer to their purpose to maintain the excellence of their goods, and allude to their facilities for manufacturing. The list covers a large and varied assortment of the different lines which are familiar to the trade, most of which have been represented in former catalogues, the present one, however, containing some additions which will be of interest. The trade will look with confidence to the company as thus organized for the carrying out of the policy which has given their house its high position, with the hope it may enjoy continued success and prosperity.

Announcement is made that C. M. Miller dissolved his connection with S. A. Haines and C. M. Hopkins continue under the firm name as before. S. A. Haines & Co. are now occupying their new and more commodious quarters, 90 Chambers street, where they have better accommodations for handling their increasing lines of goods.

Announcement is made of an important change in the business of one of the oldest and best known Hardware houses in the country. Pratt & Co., Buffalo, N. Y., having decided to retire from the wholesale Hardware business, have sold to Walbridge & Co., of their city, their entire stock of Shelf Hardware, and commend their customers in this line to them. They, however,

retain Iron, Steel Nails and Spikes, Horse-shoes, Heavy Hardware and Metals at the old stand, where they will be pleased to receive orders as heretofore. From the circular of Walbridge & Co., announcing to the trade this consolidation of the Hardware business of Pratt & Co. with their own, we make this extract:

We will for the present remain at the old stand, Nos. 44 to 50 Terrace, heretofore occupied by Pratt & Co., and will carry the same standard brands of goods and extensive assortment for which their house has been widely and favorably known, and it shall be our earnest endeavor to maintain the reputation for fair and honorable dealing which they have enjoyed during the 50 years which have elapsed since their house was established. We shall continue to use the catalogues of General Hardware issued by Messrs. Pratt & Co., and will send out discount sheets and corrections from time to time, as may be deemed expedient. We beg to remind our friends, however, that it is impossible to advise them closely of the fluctuations of the market, and assure them that all orders with which they may favor us will be filled at the lowest current prices. In addition to the lines of goods purchased of Messrs. Pratt & Co., we shall continue as heretofore to carry a stock of Tin Plates, Sheet Iron, Copper, &c.; also of Lamps and Kerosene Fixtures of all kinds. It is 17 years since our own house commenced business in this city, and we take this occasion to convey our sincere thanks for past favors to our old customers, with many of whom we have enjoyed intimate and pleasant relations during the whole or a great portion of this period.

The houses concerned in this change, who are widely and favorably known, will have the best wishes of the trade for their success under the new arrangement.

J. Stevens & Co., Chicopee Falls, Mass., manufacturers of the Stevens Firearms, Fine Machinists' Tools, &c., have sold out their business to the new corporation just formed under the name of the J. Stevens Arms and Tool Co., with the following officers: Joshua Stevens, president; William B. Fay, Joshua Stevens, George S. Taylor, directors; Irving H. Page, secretary; James E. Taylor, agent and treasurer. The company thus organized took possession of the business January 1st, 1886.

ITEMS.

W. B. Belknap & Co., Louisville, Ky., present to the trade with their new year's greeting a circular of Plow Material and kindred lines, representing with illustrations Hames, Horse Collars, Plow Shapes, Clevises and a number of other articles of interest to the trade. They refer to their assortment as having been enlarged and their stock increased both in extent and variety, and allude to the prices of the class of goods illustrated as now so low that they cannot fail to prove a good investment.

The White Mountain Freezer Co., Nashua, N. H., make an exhibit of some of their leading Freezers in their announcement on page 24, where, it will be observed, they illustrate their Hand or Power Freezer, New Platform Freezer, adapted especially to hotels, restaurants, &c., and Sand's Family Ice Crusher, the White Mountain Hand Freezer, &c.

The Paddock-Hawley Iron Co., St. Louis, issue their illustrated trade circular for 1886, covering their well-known line of goods, including an assortment of Wagon and Carriage Hardware, Trimmings and Wood Material, Horse Nails, Horseshoes, &c., and an extensive variety of miscellaneous goods. The National Tubular Axle is prominently represented and its special features explained.

Our readers will observe on page 18 the advertisement of the A. F. Pike Mfg. Co., Pike Station, N. H., in which they present illustrations of many kinds of small Stones for sharpening Edge Tools, a line in which they are such extensive manufacturers. They advise us that they have recently very much increased their business and enlarged their facilities for production, so that they are in a position to supply almost anything in the Oil Stone and Scythe Stone line.

I. E. Swift, Ishpeming, Mich., issues a large and effective calendar similar to the one to which we called the attention of our readers last year, each sheet, besides the calendar of the month, displaying some of the leading goods sold by Mr. Swift. His business is devoted especially to Heavy Hardware, Mine, Railway and Mill Supplies.

Chas. B. Holdrege, Bloomington, Ill., representing the Simmons Hardware Co., of St. Louis, issues in artistic and attractive form a new year's card to his customers and friends.

Merchant & Co., Philadelphia and New York, opened January 1 an office at 135 Lake street, Chicago, where it is their purpose to carry in stock a full line of their guaranteed Roofing Plates—Gilbertson's Old Method and Camaret.

We are requested by Robert B. Hugunin, Hartford, Conn., to inform the trade that all genuine Improved Hugunin Adjustable Sash Balances and Sash Locks have "Robt. B. Hugunin, Patentee and Solely Authorized Maker," cast directly upon their face plates. He intimates that all others should be rejected as imitations of his goods, and that, as he has no agent in New York City, all orders and inquiries should be sent directly to him at Hartford, Conn.

Bruce & Cook, of this city, have issued to the trade their annual office calendar, accompanied by a circular of New Year greetings, from which we quote as follows:

With much the largest portion of our friends the year past has been one more

free from business perplexities than several of the previous ones. The general impression of the end of the long night of depression, and the more hopeful aspect of industrial enterprises, have given tone and stability to our markets that have long been wanting. In our opinion nothing but the fear of demoralization of the currency, from the continued coinage of silver, prevents the enterprise that would speedily supply work and wages to all willing and skillful hands. We look hopefully to Congress promptly to relieve the business interests of the country from this danger; this done, we shall confidently anticipate for you and ourselves a year of prosperity for all legitimate and prudent enterprises.

We are advised that the Union Hardware Co., of Torrington, Conn., have entered into an arrangement with Tower & Lyon, of 96 Chambers street, New York, whereby Tower & Lyon will represent them direct to the trade in the marketing of their goods, and also take charge of their New York office, which remains temporarily at 75 Chambers street, but will be removed February 1 next, to Tower & Lyon's headquarters at 96 Chambers street. We understand that Tower & Lyon have become stockholders in the Union Hardware Co., and the friends of both concerns will receive the announcement of this arrangement with satisfaction, as one promising well for both these well known and enterprising houses.

Our readers will observe that J. B. Shannon & Sons, 1020 Market street, Philadelphia, in their announcement on page 38, illustrate one of their styles of Polished Brass Railing for offices and banks. Other patterns are displayed in their illustrated catalogue.

The Lansing Wheelbarrow Co., Lansing, Mich., have appointed S. A. Haines & Co., 90 Chambers street, sole agents (except as regards the city of Chicago) for the sale of their Wheelbarrows, Hand Carts, Trucks, &c., on which goods they are authorized to make the manufacturers' most favorable terms. The different styles they manufacture, and the special features which characterize them, are illustrated in their catalogue.

The Reed Mfg. Co., Canajoharie, N. Y., have also appointed S. A. Haines & Co., 90 Chambers street, sole agents for the sale of their goods. Their line covers, it will be remembered, Reed's Steel Arm Barn Door Hangers for either steel or wood track, Reed's Patent Gravity Gate Latch, Wrought-Iron Hinges, &c., Reed's Patent Self-Lubricating Pulley and Tackle Blocks, &c. These goods, which have been favorably received by the trade, and are recognized as having merit, are illustrated in their circular. S. A. Haines & Co. are authorized to give the company's best terms, and attention is called to the favorable prices at which the goods may be purchased.

The Nashua Lock Co., 36 Pearl street, Boston, and 148 Lake street, Chicago, are about to issue a circular to the trade advising them that a new catalogue and price list is in preparation, which they hope to distribute to their patrons next month. In the meantime they state that they will adopt as their list prices and discounts those made by the Association of Lock Makers for goods corresponding with theirs in quality.

There is a good deal of activity on the part of the different manufacturers of Lawn Mowers in presenting their goods to the trade, and the prospect is that the coming season will be satisfactory, at least in the quantity of machines sold.

We are in receipt of an effective circular or poster illustrating the New Easy Lawn Mower made by the Blair Mfg. Co., Springfield, Mass. It shows the different styles in which the Mower is made, and the advantages claimed for it in different uses.

Concerning the destruction of the forge shop and rolling mill of the E. D. Clapp Mfg. Co., Auburn, N. Y., on the night of January 3, of which our readers will learn with regret, the company have issued the following circular to their customers, under date January 4:

We regret to inform you that our rolling mill and one of our forge shops were last night completely destroyed by fire. While our loss is heavy and we shall necessarily be inconvenienced by the loss of a large portion of our forging capacity, yet, having remaining all of our finishing machinery, and at least one-half our drop hammers, together with a large stock of finished goods, we shall be able to continue our business as usual, and by putting on a double force of men and by running our No. 1 Forging Shop day and night, shall be able to execute orders with our usual promptness.

The Standard Tool Co., Cleveland, Ohio, manufacturers of Straight Lip Increase Twist Drills and special tools, issue, with the acknowledgment of past favors, their new catalogue, in which they describe, with illustrations and list prices, the goods of their manufacture, to the quality of which and their facilities for producing them they allude. They direct special attention to their Screw Driver Bits and Machinists' Screw Driver as new tools which mechanics will appreciate, referring to them as handy and indestructible and made of the best material. They also refer specially to their Reamers as made and ground by the Pratt & Whitney new process, which they describe as giving them an exactness of size and a cutting edge superior to the ordinary Reamer.

C. F. Richardson, Athol, Mass., issues a circular describing his Caliper Screw, with his patent Sliding Nut, and the spring

Caliper with Sliding Nut. These articles, as well as his Iron Level, are shown in his advertisement on page 44.

The Bryan Mfg. Co., Bryan, Ohio, issue a catalogue and circular relating to their line of Champion Bolted Wheelbarrows, of the different styles of which they give illustrations. They allude especially to their Iron Center Wheel as a new article, to the merits and selling qualities of which they refer.

TRADE MATTERS.

The following letter from one of the twelve houses appointed by the Ammunition Manufacturers' Association as special dealers will be of some interest to the trade as indicating the probable effect of the arrangement as estimated from their standpoint:

The plan adopted by the Ammunition Manufacturers' Association is very satisfactory to us, and we think it should be to all parties interested, as it guarantees a profit to every contract dealer. We are meeting with very good success, as we have been appointed one of the special agents, and as such can furnish contracted parties tributary to this market at no greater cost to such parties than if they had ordered of the association direct. At the same time we make a profit on their business without any expense to them. All sales with contract parties we will report to the association, sending such contract party a duplicate of the report which such party is interested in. Many of the contract parties are sending us their orders. Our stock amounts to over \$100,000 in Ammunition alone. It will be our intention to carry an assorted stock large enough to fill all orders promptly. We notice that parties to whom contracts have been sent are signing very freely. While it is yet early to form any decided opinion regarding the workings of the new scheme, yet from what we do know can see no objections to it, as it will insure a profit to all parties interested.

Peavey Bros., Sioux City, Iowa, in their lately issued address to the trade, January 1, 1886, refer as follows to the business of the past year and the future outlook:

The year just closing has been one, taken altogether, of reasonable profit and satisfaction to the Hardware and Iron trade. Manufacturers and those directly interested in the Iron business knew full well that a depreciation in the values of Iron products equal to that which has taken place each year since 1882 would mean disaster and wreck, and that every other industry of our country would, in sympathy, be materially affected. Business wisdom and forethought has seldom been greater taxed, and rarely more successful in its efforts to prevent further decline in prices. The year has, as well, been marked for the struggle and influences that have been brought to bear for higher values. The advances for the past 60 days have been conspicuous and important. Manufacturers generally are quoting for immediate acceptance and specifications, which has had a tendency to invite liberal orders for some lines of goods. The feeling seems to be that the advances will be made and maintained, more especially on the best class of goods, such as require in their make up the highest grade of Ores and Metals.

We learn of some rail mills being booked with orders for the entire season of 1886 at prices 33½% higher than prices ranged one year ago. The Steel Wire mills have formed a strong combination, and have so far maintained firmly each advance, thus compelling the Barbed Wire manufacturers to fall in line and advance their goods ½ cent per pound. The year, however, and with the very noticeable and pleasing fact that in a commercial way we are on a more solid footing and have suffered less from business failures than in any previous year since 1881. For 1886 we would not presume to foresee and tell of its happenings, but gladly give our views in a general way. We are of the opinion that for the first six months of the year the advances already taken place will be firmly maintained. We base our opinion on these facts: Firstly, Hardware and Iron products are reasonably cheap at present prices; secondly, the spring months call forth a general and the largest demand of any time during the season for these goods. This fact of itself we think important, and will tend largely to hold up prices. We therefore think dealers generally will be justified in placing early and fairly liberal orders. We have no faith in the common talk of "boom prices." The demand is too far behind the supply, as is evidenced by the number of idle mills and furnaces at this time.

Chicago and Pittsburgh.

In consequence of delay in the Western mails, our Pittsburgh and Chicago market reports did not reach us in time for insertion.

A furnace tuyere so constructed that it may be used even if partially destroyed by heat has been patented by A. Brown, of Hellertown, and W. R. Clark, of Bethlehem, Pa. It is composed of three or more independent convolutions of tubing, placed one in advance of the other, each convolution terminating at one end in a straight inlet-pipe and at the other end in a straight outlet-pipe. The three inlet-pipes thus formed connect with a main inlet-tube, and the three outlet-pipes connect with a main outlet-tube. Each of the inlet and outlet pipes is provided with a cut off valve. If either one of the convolutions becomes burned and leaky it is disconnected from the main tubes by closing its valves. Thus the remainder of the tuyere may be used until the entire tuyere has become useless.

Pekin, in the far North of China, is now connected by a direct telegraph line through Canton with Lungchow, on the frontier of Tonquin, the extension from Canton to the latter place being made during the recent war, purely for military purposes. This great line, stretching through the Chinese Empire from North to South, is to be supplemented by a line along the Southern borders of China.

L. COES'
GENUINE IMPROVED
Knife Handle
PATENT
Screw Wrenches
MANUFACTURED BY
L. COES & CO.,
Worcester, Mass.
ESTABLISHED IN 1839.




Patented July 6, 1880. Patented July 8, 1884.
Registered March 31, 1874.

Sectional view illustrates our NEW KNIFE HANDLE, showing Malleable Iron Frame and Shank of Bar keyed into position.
Straight Bar, Extra LONG NUT FOR SCREW IN JAW.

The Best Made and Strongest Wrench in the Market.
Send for Illustrated Price List and Circular.

DURRIE & McCARTY,
NEW YORK,
Sole Agents.

ILLINOIS IRON & BOLT CO.,

Nos. 20 to 26 Main Street,
CARPENTERSVILLE, KANE CO., ILL.,
MANUFACTURERS OF

BLACKSMITHS' TOOLS,

Pat'd May 15, 1883.



PATENT STEEL WAGON SKEINS,
Jack Screws, Tire Benders, Track Jacks,
Carriage Makers' Vises,
SAD IRONS, COPYING PRESSES AND STANDS, &c.

E. MERRITT & CO.
ESTABLISHED 1859 — BROCKTON, MASS.
The Only Manufacturers of a Complete Line of
TACK AND NAIL MACHINERY.
SEND FOR CIRCULAR. — UPRIGHT DRILLS.

BRASS AND IRON SHIP CHANDLERY HARDWARE.
Yacht Fixtures, Nickel-Plated Canoe Trimmings, Cheapest and Best Side Lights in the Market, Awning Hardware, Specialties in Brass made to Order.
THE SHELTON BRASS HARDWARE CO., Birmingham, Conn.
Send for Illustrated Catalogue.
NEW YORK WAREHOUSES: 95 Chambers St. CHICAGO WAREHOUSES: 177 Lake St.

1886
PENNSYLVANIA
LAWN MOWER.



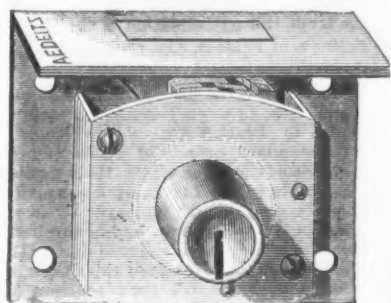
Has No Equal,
Surpassing All Others,
AND PROVEN
"THE BEST."

Illustrated Price lists sent upon application.
Please write for same to

LLOYD & SEPPLEY HARDWARE CO., Phila.
DURRIE & McCARTY, New York.
AMES PLOW CO., Boston, Mass.
PIATT & CO., Buffalo, N. Y.
SIMMONS HARDWARE CO., St. Louis, Mo.
HAMILTON & MATHEWS, Rochester, N. Y.
MARKLEY, ALLING & CO., Chicago, Ill.
LUDAN, ORRIS & CO., Pittsburgh, Pa.
JANNEY, SEIPLE & CO., Minneapolis, Minn.
HUNTINGTON, HOPKINS & CO., San Francisco, and Sacramento, Cal.
FOSTER, STEVENS & CO., Grand Rapids, Mich.
GEO. TRITCH BROS. CO., Denver, Col.
MATHEWS, CASE & CO., Los Angeles, Cal.
ANDREW TREADWAY & SONS, Dubuque, Iowa.

KRUSE & RAHLMANN, Cincinnati, Ohio.
JOHNSON BROS., Cincinnati, Ohio.
CLARK, QUINN & MOSE, Peoria, Ill.
BEHL, S. S. & CO., Detroit, Mich.
LAYMAN, CAREY & CO., Indianapolis, Ind.
LOCKWOOD, TAYLOR & CO., Cleveland, Ohio.
W. FRANKFURTH & CO., Milwaukee, Wis.
WALTER S. LUDLOW, Cincinnati, Ohio.
THE TODD-BONIGAN IRON CO., Louisville, Ky.
MOOREHOUSE, WELLS & CO., Decatur, Ill.
A. E. BUNESTEL, Troy, N. Y.
M. MITCHELL & CO., Columbus, Ohio.
BLISH, MIZE & SILLIMAN, Ashtabula, Kas.
SEULIZ & HOSER, St. Joseph, Mo.

A. E. DEITZ.

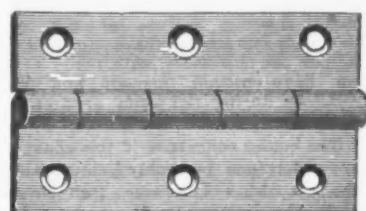


No. 51 Lock.

DURRIE & McCARTY, Agents,

97 Chambers and 81 Reade Sts.,

NEW YORK.



W. & J. TIEBOUT,

MANUFACTURERS OF

BRASS, GALVANIZED & SHIP CHANDLERY
HARDWARE.

Nos. 16 & 18 Chambers Street,
NEW YORK.



ALWAYS GIVES THE
UTMOST SATISFACTION.

Main Belting Co.,

Manufacturers of
THE LEVIATHAN

COTTON

BELTING.

Unsurpassed for
Strength, Durability and
Cheapness.

Made to any length,
Width and Strength.

Main Driving Belts.
Guaranteed to Run
Straight, Even Through
out.

No Cross Joints, Un-
affected by Damp-
Clings well to the Pulley,
Has no equal. In fact,
is THE BELT.

MAIN BELTING

COMPANY,

S. W. cor. Ninth and Reed
Sts., Philadelphia.

Also
248 East Randolph St.
CHICAGO.



BRYANT'S PATENT
EGG BEATERS.

SIMPLE, PRACTICAL,
NOVEL.

Retails at 20 Cents Each.

Price, \$2.00 per doz. and dis.

ADDRESS MANUFACTURERS,

PAINE, DIEHL & CO.,

12 BANK STREET,

Philadelphia, Pa.



DYNAMITE

FOR ALL KINDS OF BLASTING.

CAPS, FUSE

AND ALL

BLASTING SUPPLIES.

Write for Illustrated Pamphlet. Mailed free.
Agents wanted.

ÆTNA POWDER CO.,

98 Lake St., Chicago.

SEELEY, CHURCH & COMPANY,

PACIFIC COAST AGENTS

FOR EASTERN MANUFACTURERS

IRON, STEEL, HARDWARE, &c.

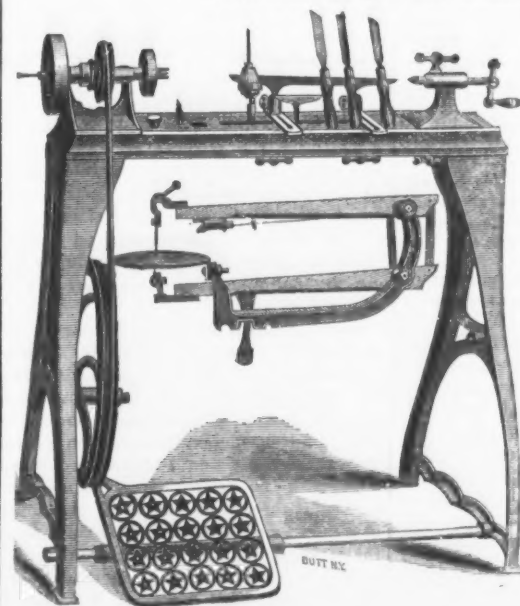
Correspondence solicited.

No. 30 California St. (Rooms 6 and 7), San Francisco, Cal.

WE HAVE ADDED THE

GOODELL LATHE AND SAW,

As seen in this Cut, to our Line of SCROLL SAW
SUPPLIES for the coming year.



It is by far the best Lathe in
market. We have also made
great improvements on the

Lester, Rogers and Cricket Saws.

Another generation of boys is
coming to the front, so that the
demand for these Saws is fast
increasing, and seems likely to
be as large as it was eight years
ago. Dealers can increase their
fall trade by laying in a stock.

Goodell Lathe and Tools... \$10.00.
Scroll Saw Attachm't, extra... 2.00.
Lester Saw and Lathe... 10.00.
Rogers Saw, No. 1... 3.50.
Cricket Saw, all Iron... 2.50.
Bracket Sets, Nickel Plated,
per doz... 15.00.
Bracket Sets, Pleasure and
Profit, per doz... 10.00.

We are headquarters in New
York for Wood, Designs and
supplies of all kinds for bracket
sawyers. Our Star Bracket
Blades are superior to any others
in use, and are in demand in
many other countries.

There is a regular trade dis-
count to all dealers.

MILLERS FALLS CO.,

74 CHAMBERS STREET, NEW YORK.

CHAMPLAIN

Forged Horse Nails.

MANUFACTURED BY THE

NATIONAL HORSE NAIL CO.,

Vergennes, Vermont.

HOT FORGED AND COLD HAMMERED POINTED. MADE OF BEST
NORWAY IRON AND WARRANTED.

WAREHOUSE

97 CHAMBERS AND 81 READE STREETS NEW YORK.

DURRIE & McCARTY, Sole Agents.

H. B. SEIDEL,
President.

W. HASTINGS,
Vice-Pres. and Gen'l Mgr.

E. T. CANBY,
Sec. and Treas.

THE SEIDEL & HASTINGS CO.

WILMINGTON, DELAWARE,

New York Office, No. 221 Pearl, Corner Platt Street,
MANUFACTURERS OF

BEST CHARCOAL BOILER PLATES,

AND PLATE IRON GENERALLY.

ALSO BEST QUALITY HOMOGENEOUS STEEL PLATES.

We ask the special attention of the trade to our C. H. No. 1 Boiler Plates, which we
manufacture expressly for the Shell of Steam Boilers and stamp 50,000 pounds T. S. when
desired. One hundred and sixteen tests of this iron, made during the last three years by the
U. S. Inspectors of Steam Vessels, show an average tensile strength of 58,808
pounds to the sectional square inch, and an average reduction of area of the fractured
section of 30% per centum. Our prices are as low as the production of a good article will admit of.



VARIETY IRON WORKS.

ALFRED C. REX & CO.,

Manufacturers of

PATENTED HARDWARE SPECIALTIES AND NOVELTIES.

MAIN OFFICE AND FACTORY

FRANKFORD, PHILA.

BRANCH OFFICES:

126 Chambers St., New York, Chas. E. Spier, Mgr.

and 415 Commerce St., Phila.

New Spring Specialties—King Egg Beaters, awarded medal at American Institute, New
York; King Candle Lamp and Lantern, cheapest combination ever made.

STRONGEST ACME WRENCH AND BEST.



ALL STEEL CASE-HARDENED JAWS. WARRANTED. MANUFACTURED BY

OWSLEY BROS. & MARBLE, 784 to 794 Madison St., CHICAGO, U. S. A.

Description and Price List Furnished upon Application.

PURE TURKISH EMERY.

WALPOLE EMERY MILLS,

South Walpole, Mass.

DANVILLE NAIL & MANUFACTURING CO.,

Danville, Pa.



Common,
Fencing,
Cinch,
Flooring,
Car,
Boat,
Finishing,
Box,
Fine Finishing,
Casing,
Slating,
Roofing,
Barrel,
Cement,
Tobacco,
Lining,
Brads,
And Cut Spikes,
Or any
Special
Size or
Pattern of
Cut Nails
Or Cut Spikes.



SALES AGENTS:

BORDEN & LOVELL,

70 and 71 West Street,
NEW YORK.

CORNING & CO.,

ALBANY, N. Y.

ESHERICK & CO.,

263 South 4th Street,
PHILADELPHIA.

H. D. & S. J. WATERMAN,

612 North 3d Street,
ST. LOUIS, MO.

WM. F. MANSEN,

GALVESTON, TEXAS.



DANVILLE NAIL WORKS,

LOCATED ON

Penna. Railroad, Phila. & Reading Railroad, and Delaware, Lackawanna & Western Railroad.

These three roads to all important points give us unequalled Shipping facilities,
enabling us to guarantee *prompt shipment* and *quick delivery*.

DANVILLE NAIL WORKS.

The most important and best equipped Establishment
for making Nails.

This factory was the first to adopt and successfully operate the REGENERATIVE GAS FURNACES,
twenty-five of which have lately been constructed in the Factories in and about Wheeling.

Current Hardware Prices, January 6, 1885.

HARDWARE.

Ammunition.

| | |
|--|-----|
| Blacksmiths' Caps, Percussion, 1000 | 50¢ |
| Black & Goldmark | 50¢ |
| F. L. Waterhouse, 1-10's | 50¢ |
| E. R. Trimmer Edge, 1-10's | 50¢ |
| E. R. Ground Edge, Central Fire, 1-10's | 50¢ |
| Double Waterproof, 1-10's | 50¢ |
| Musket Waterproof, 1-10's | 50¢ |
| S. B. Ground Edge, Central Fire, 1-10's | 50¢ |
| Union Metallic Cartridge Co. | 50¢ |
| C. F. Trimmer | 50¢ |
| Rita Fire Military Cartridges | 50¢ |
| Cent. Fire Cartridges, Pistol and Rifle | 50¢ |
| Cent. Fire Cartridges, Military & Sporting | 50¢ |
| Blank Cartridges, 1st quality | 50¢ |
| Blank Cartridges, 2nd quality | 50¢ |
| Blank Cartridges, 3rd quality | 50¢ |
| Blank Cartridges, 4th quality | 50¢ |
| Blank Cartridges, 5th quality | 50¢ |
| Blank Cartridges, 6th quality | 50¢ |
| Blank Cartridges, 7th quality | 50¢ |
| Blank Cartridges, 8th quality | 50¢ |
| Blank Cartridges, 9th quality | 50¢ |
| Blank Cartridges, 10th quality | 50¢ |

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| Cartridges | 50¢ |
| Rim Fire Cartridges | 50¢ |
| Cent. Fire Cartridges, Pistol and Rifle | 50¢ |
| Cent. Fire Cartridges, Military & Sporting | 50¢ |
| Blank Cartridges, 1st quality | 50¢ |
| Blank Cartridges, 2nd quality | 50¢ |
| Blank Cartridges, 3rd quality | 50¢ |
| Blank Cartridges, 4th quality | 50¢ |
| Blank Cartridges, 5th quality | 50¢ |
| Blank Cartridges, 6th quality | 50¢ |
| Blank Cartridges, 7th quality | 50¢ |
| Blank Cartridges, 8th quality | 50¢ |
| Blank Cartridges, 9th quality | 50¢ |
| Blank Cartridges, 10th quality | 50¢ |

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| Primer | 50¢ |
| Berdan Primers, all sizes, and B. L. Caps (for | 50¢ |
| Sturtevant shells) | 50¢ |
| All other Primers, all sizes | 50¢ |
| Shells | 50¢ |
| Paper Shot Shells, 1st & 2d or S. G. quality | 50¢ |
| Seabell's Combination Shot Shells | 50¢ |
| Paper Shot Shells, Club, Rival, Climax | 50¢ |
| Paper Shot Shells, Star Brand | 50¢ |
| Brass Shot Shells, 1st quality | 50¢ |
| Brass Shot Shells, Club, Rival & Climax | 50¢ |

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|-------------------------------------|-----|
| Wads | 50¢ |
| U. M. C. & W. R. A. - B. E. 11 up | 50¢ |
| U. M. C. & W. R. A. - B. E. 9 to 10 | 50¢ |
| U. M. C. & W. R. A. - B. E. 7 to 8 | 50¢ |
| U. M. C. & W. R. A. - P. E. 9 to 10 | 50¢ |
| U. M. C. & W. R. A. - P. E. 7 to 8 | 50¢ |
| U. M. C. & W. R. A. - P. E. 5 to 6 | 50¢ |
| U. M. C. & W. R. A. - P. E. 3 to 4 | 50¢ |
| U. M. C. & W. R. A. - P. E. 1 to 2 | 50¢ |
| U. M. C. & W. R. A. - P. E. 0 to 1 | 50¢ |

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|-------------------------------|-----|
| Anvils | 50¢ |
| Small Anvils | 50¢ |
| Large Anvils | 50¢ |
| Armstrong's Mouse Hole | 50¢ |
| Armstrong's Mouse Hole, Extra | 50¢ |
| Trenton | 50¢ |
| Wilmington | 50¢ |
| J. & R. Carr Patent Solid | 50¢ |
| Anvil Vise and Drill | 50¢ |
| Millers Falls Co. 18 in. | 50¢ |
| Cheney Anvil and Vise | 50¢ |
| Allen Combined Anvil and Vise | 50¢ |
| Richardson's Anvil and Vise | 50¢ |

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|-----------------------|-----|
| Apple Parers | 50¢ |
| Advance | 50¢ |
| Champion | 50¢ |
| Empire State | 50¢ |
| Family Bay State | 50¢ |
| Gem | 50¢ |
| Improved Bay State | 50¢ |
| Improved Penn. 1884 | 50¢ |
| Jersey | 50¢ |
| Little Star | 50¢ |
| Model | 50¢ |
| New Lightning | 50¢ |
| Rocking Table | 50¢ |
| Triumph 1883 | 50¢ |
| Turntable | 50¢ |
| Two Knife | 50¢ |
| Waverly | 50¢ |
| White Mountain | 50¢ |
| Whitmore's Simplicity | 50¢ |

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|--------------------|-----|
| Augers and Bits | 50¢ |
| Douglas Mfg. | 50¢ |
| Other 1st quality | 50¢ |
| Other 2d quality | 50¢ |
| Other 3d quality | 50¢ |
| Other 4th quality | 50¢ |
| Other 5th quality | 50¢ |
| Other 6th quality | 50¢ |
| Other 7th quality | 50¢ |
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| Douglas Mfg. | 50¢ |
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| Other 3d quality | 50¢ |
| Other 4th quality | 50¢ |
| Other 5th quality | 50¢ |
| Other 6th quality | 50¢ |
| Other 7th quality | 50¢ |
| Other 8th quality | 50¢ |
| Other 9th quality | 50¢ |
| Other 10th quality | 50¢ |

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| Bellows | 50¢ |
| Blacksmiths' | 50¢ |
| Hand Bellows | 50¢ |
| Belting, Rubber | 50¢ |
| Standard | 50¢ |
| N. Y. R. & Co. Standard | 50¢ |
| N. Y. R. & Co. Ex. Standard | 50¢ |
| Cleveland Rubber Co. Extra Standard | 50¢ |
| ard | 50¢ |

| | |
|-----------------|-----|
| Blind Stoppers | 50¢ |
| Standard | 50¢ |
| Extension, 1st | 50¢ |
| Extension, 2nd | 50¢ |
| Extension, 3rd | 50¢ |
| Extension, 4th | 50¢ |
| Extension, 5th | 50¢ |
| Extension, 6th | 50¢ |
| Extension, 7th | 50¢ |
| Extension, 8th | 50¢ |
| Extension, 9th | 50¢ |
| Extension, 10th | 50¢ |

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| Blind Fasteners | 50¢ |
| Standard | 50¢ |
| Extension, 1st | 50¢ |
| Extension, 2nd | 50¢ |
| Extension, 3rd | 50¢ |
| Extension, 4th | 50¢ |
| Extension, 5th | 50¢ |
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| Blind Stoppers | 50¢ |
| Standard | 50¢ |
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| Blind Stoppers | 50¢ |
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| Blind Stoppers | 50¢ |
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| Cartridges | 50¢ |
| Blacksmiths' | 50¢ |
| Hand Cartridges | 50¢ |
| Belting, Rubber | 50¢ |
| Standard | 50¢ |
| N. Y. R. & Co. Standard | 50¢ |
| N. Y. R. & Co. Ex. Standard | 50¢ |
| Cleveland Rubber Co. Extra Standard | 50¢ |
| ard | 50¢ |

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INDUSTRIAL ITEMS.

NEW YORK.

The employees of both of the glass works at Ithaca have received orders from President Clive, of the National Glass Blowers' Association, to discontinue work, and as a result both factories have closed down. One hundred and fifty men are thrown out of employment.

The Millerton Iron Co., Millerton, Dutchess County, N. Y., in a circular, under date of January 1, say: "The opening of the year 1886 finds our new blast furnaces nearly completed, and we expect in a few days to be able to fill all orders from our old customers and from others who may favor us. The destruction of our plant by fire in May last caused us to decide upon the erection of an entirely new structure, with increased facilities, and into it we have incorporated all appliances and improvements which, while decreasing the cost of manufacture, would insure a uniform character to our product."

Otis Brothers & Co. have been awarded the contract for the hoisting engine at Shaft No. 14 of the new aqueduct. It will have their special safety attachments and be operated by a hand rope the same as in elevator duty.

PENNSYLVANIA.

At the Hartman Nail Wire Works, Beaver Falls, there were turned out in the 24 hours' run on one day 167 kegs of wire nails. This was the largest output ever made there, and the management gave the men gratuities in consideration of it.

The Mount Hickory Furnaces, at Sharpville, bought some time since by Hon. W. L. Scott, of Erie, are to be put in blast at once, under the management of A. M. and Josiah Robbins, who formerly managed the Rosena Furnace, at New Castle.

Douglass Furnace, of Pierce, Kelly & Co., at Sharpville, made one of the quickest repairs on record. Twenty-four days from the time the lining fell in it had been relined and is again in blast.

Orr, Painter & Co., of the Reading Stove Works, have shipped over 2000 stoves to Chicago during the past two seasons.

The 10 per cent. reduction in the wages of the nailers at the works of the E. & G. Brooke Iron Co., at Birdsboro, went into effect on the 1st inst.

The Enterprise Colliery, at Excelsior, operated by Charles Baumgardner & Co., of Lancaster and Philadelphia, suspended pending the settlement of a suit brought by Mine Inspector Ryan. Four hundred men are thrown out of employment.

Northampton Furnace (anthracite), in the Lehigh Valley, will blow in soon.

Howard Furnace (charcoal) will not blow in this year.

Mabel Furnace, Sharpville, made 2480 gross tons of iron in December.

Katherine Furnace (anthracite), in the Lower Susquehanna Valley, blew in on the 3d inst.

Stack No. 5 of the Allentown Iron Co.'s furnaces has been working badly of late, and it is feared the furnace will have to be blown out for repairs.

It is said that parties have been examining the Rodman Furnace property, at Roaring Springs, with a view of putting the furnaces in operation.

PITTSBURGH AND VICINITY.

The laborers at the Lucy Furnace, Pittsburgh, have had their wages increased.

The firm of Robinson, Rea & Co., founders and machine builders, of Pittsburgh, has been dissolved and is succeeded by the Robinson-Rea Mfg. Co., a chartered corporation.

The Linden Steel Co., Limited, Pittsburgh, have purchased a shear which has a knife that will cut at one stroke a plate $1\frac{1}{4}$ to $1\frac{1}{2}$ inches thick and 110 inches wide.

Mr. James Morrison, of Belle Vernon, a gentleman interested in the glass industry there, was in McKeesport last week looking after a site for a glass works, the erection of which will cost \$30,000, and almost twice that sum to be put in successful operation. It is proposed to manufacture colored window-glass of a fine quality.

Marland, Neely & Co., nut manufacturers, Southside, are making extensive additions to their works and intend to largely increase their force of men. Natural gas has been put in all the furnaces and the works will run double turn in all departments.

Cunningham & Ihmsen's glass factory, on the Southside, which has been idle for some time, started up on Monday last with 40 bottle-blowers.

A new tack factory is to be erected on the Southside. About 150 machines with the latest improvements will be put in, and employment will be given to 400 hands. A substantial building will be put up immediately, and it is expected that the manufacture of tacks will be begun at least by the 1st of July.

A large amount of extra heavy bridge iron has just been completed at Wilson, Walker & Co.'s Union Iron Mills. It is for a bridge which is to span the Mississippi River at St. Paul, and which, when completed, will be probably the finest bridge structure in the world. It will be 700 feet from the water, and 1560 feet in length. The longest span will be 350 feet in length, and the amount of iron and steel required in its construction will be 3000 tons.

The Westinghouse Electric Co. last week applied for a charter for the purpose of selling and dealing in machinery and appliances for the generation, transmission and utilization of electricity. The capital stock is \$1,000,000. Geo. Westinghouse, Jr., of Pittsburgh, owns 193,000 shares.

OHIO.

The representatives of the American Flint Glass Workers' Union and the managers of the Buckeye and La Belle glass works, at

Martins Ferry, have arrived at an understanding, and those two factories, which have been idle for 13 months, will resume operations at once.

Bloom Furnace (charcoal), in the Hanging Rock region, will blow in soon.

The Graffton Iron Co., at Leetonia, will blow in one of their furnaces about the 11th inst.

A co-operative nail works is to be established at Wellston, Jackson County, with a capital of \$150,000. It is expected that the factory will be in operation by May 1.

The report that the Coshocton Iron and Steel Works have been closed indefinitely on account of not being able to compete at the prevailing prices is entirely false. The works are running full time.

Anna Furnace (coke), in the Mahoning Valley, will blow in in a few days.

One stack of Hazelton Furnace and one of Himrod, in the Mahoning Valley, will blow in soon.

Thomas Furnace, at Niles, blew in a few days ago.

Sarah Furnace, in the Hanging Rock region, will blow in about February 1.

Star Furnace, in the Hanging Rock region, will blow in this month.

The American Nail Machine Co., Ashtabula, report business in their line good. They have just closed a contract with the Pacific Iron and Nail Co., San Francisco, Cal., for a large number of their improved cut-nail machines, and have several contracts pending.

ILLINOIS.

A Chicago drill company has been awarded the State contract to bore an experimental well, 2000 feet in depth, in the salt basin of Nebraska, the purpose being to test the amount and quality of the brine.

The Van Depeole Electric Railway Motor Co., of Chicago, have been incorporated by Lucius Clark, Wm. A. Stiles, and John Easau. The capital stock is \$500,000.

There was a change in the management of the Calumet Iron and Steel Co., Chicago. Mr. Daniel P. Eels, of Cleveland, has assumed the presidency of the company, Mr. Cummings and Mr. Bradley retiring from active management. The nail department of these works is in partial operation.

The brass shop of the Crane Brothers Mfg. Co., Chicago, is being enlarged.

John Mohr & Son, Chicago, have secured a contract from the Joliet Steel Co. for boiler work requiring 180 tons of steel for its completion. The works are pushed to their utmost in getting out orders.

MICHIGAN.

The Huyett & Smith Mfg. Co., of Detroit, have issued a special notice announcing that the embarrassment of M. C. Huyett & Co. in no way affects the entirely separate and distinct corporation of the Huyett & Smith Mfg. Co., established under the laws of Michigan. Mr. Huyett sold his stock in the company two years ago, and since then has had no interest in it whatever. Mr. D. M. Ferry, president of the D. M. Ferry Seed Co., has since been president of the Huyett & Smith Mfg. Co., which, under his direction, have largely extended their business and reputation for manufacturing the celebrated Smith power-saving blowers, exhaust fans, ventilators, lumber dryers and seed-cotton elevators.

MISSOURI.

A new departure is promised by the Missouri Furnace when they start up their second furnace about the 1st of March—the production of ferromanganese from the manganiferous ores to be found near Batesville, Ark. The company are now relining their furnace and getting it in readiness to use these ores a couple of months hence provided the branch railroad at present building in the direction of the ore beds is completed by that time; otherwise they will make a start on Bessemer iron and change to manganese as soon as the ores can be reached.

KENTUCKY.

F. F. Gilmore, formerly connected with Geo. S. Moore as salesman, has established a brokerage business at 176 Second street, Louisville, in pig iron, coke, old material, nails, spikes and merchant iron, steel and tinners' stock.

MARYLAND.

Ashland Furnace (anthracite), now in blast, is rented by the Pennsylvania Steel Co., at Steelton, Pa., and is turning out Bessemer iron.

Muirkirk Furnace (charcoal) blew in this week to use up stock.

GEORGIA.

Rising Fawn Furnace, the property of the Walker Coal and Iron Co., is now turning out 120 gross tons of pig iron daily.

ALABAMA.

The Brierfield Coal and Iron Co., of Brierfield, are making about 600 kegs of nails per day at their factory. Bible Furnace, the property of the above company, is being remodeled for the use of coke, and will go into blast about the 1st of February.

The firm of Stevens & Fenton, of Birmingham, have been dissolved, Mr. Fenton retiring. A company have been organized with E. G. Stevens as president, which will be known as the Birmingham Fire Brick Works. The paid-in capital is said to be \$50,000.

The Birmingham Chain Works have just commenced operations.

The Edgton Land Co. have sent North for engines to pull their street cars.

COLORADO.

The following report by the Colorado Coal and Iron Co. gives the production for the year 1885:

| Iron and Steel Departments. | |
|----------------------------------|-------------------|
| Pig iron..... | 5,480 net tons. |
| Iron castings..... | 859 net tons. |
| Cast-iron water-pipe..... | 620 net tons. |
| Merchant bar, mine rail, &c..... | 8,310 net tons. |
| Steel rails..... | 2,048 gross tons. |
| Nails..... | 64,100 kegs. |
| Spikes..... | 1,500 kegs. |

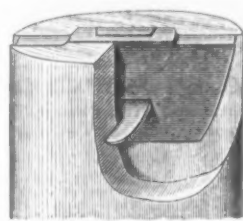
Coal and Coke Departments.

| | |
|--------------------------|--------------------------|
| Coal—Cannon mines..... | 128,212 |
| Walshburg mines..... | 89,582 |
| El Moro mines..... | 293,153 |
| Crested Butte mines..... | 80,143—561,065 net tons. |

Hardware Novelties.

Lock Wedge.

C. J. Grelmer, 1105 Biddle street, St. Louis, Mo., is the patentee and manufacturer of the lock wedge illustrated herewith. Fig. 1 shows the wedge locked in a handle, and Fig. 2 the two pieces composing the wedge. The wedge proper is made of cast iron and has a shallow slot at one side, at the bottom of which is a hole extending through the wedge. The lower side of the hole is sharply beveled and forms the end of the slot. The lock piece shown in Fig. 2 is of soft iron beveled at the smaller end. The wedge is inserted in the handle in the usual



Lock Wedge.—Fig. 1.—Showing Wedge in Handle.

manner, after which the lock piece is driven into the slot referred to above. When the lock piece reaches the bottom of the slot its beveled end following the lower side of the hole, which is also beveled, is turned aside and penetrates the wood of the handle, its final position being as indicated in Fig. 1. The lock wedge, it will be readily understood,



Fig. 2.—Detailed View of Wedge and Lock Piece.

stood, is thus securely held in position and cannot fly out unless the lock piece is with drawn. As the lock piece, however, is bent in the wood, it cannot be loosened accidentally, but must continue to hold the wedge in position as long as the handle remains intact. The simplicity of this wedge will be recognized, and the security with which, when properly operated, it will hold the handle in place.

Improvements in Planes.

The Stanley Rule and Level Co. have recently brought out several new specialties that are of interest to our readers. Four of

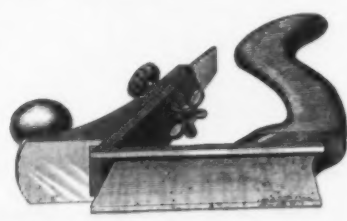


Fig. 1.—Adjustable Chamfer Plane.

these are shown in the accompanying illustrations. Fig. 1 represents a chamfer plane in which the cutter is attached to a section of the plane that is adjustable up and down. It is so arranged as to be firmly secured to the rear section at any desired point by means of a thumb-screw. The



Fig. 2.—Rebate Plane with Iron Stock and Depth Gauge.

makers state that without the use of any other tool this plane will do perfect chamfer and stop-chamfer work up to $1\frac{1}{2}$ inches in width. When the two sections are clamped together, so as to form an even base line, the tool can be used as an ordinary bench plane. Fig. 2 represents a rebate plane with an iron stock and depth gauge. The tool is so constructed that when the depth gauge is off the plane will be per-

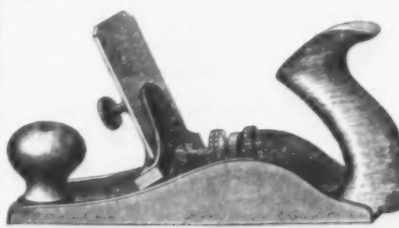


Fig. 3.—Scraping and Finishing Plane.

fectly flat on either side, and can be used with either right or left hand equally well. This makes this tool particularly useful for planing into corners or up against perpendicular surfaces. Three widths are manufactured, namely $1\frac{1}{4}$, $1\frac{1}{2}$ and $1\frac{3}{4}$ inch. Fig. 3 represents a tool that is not strictly a carpenter's tool. It is useful in cabinet-work for scraping and finishing hardwoods and

veneers. The features of the tool are clearly shown in the engraving, so that a description is scarcely necessary. By inserting a toothed plane iron, properly prepared, in place of the scraper iron, a smooth surface can be corrugated uniformly, and thus made ready for glueing. The fourth illustration represents a floor plane. The planing of floors, which is very commonly required in modern work, involves perhaps more backache and hard knee service than any other work required of carpenters. The tool here illustrated has been devised to relieve the mechanic in this respect. The length of the plane is $10\frac{1}{2}$ inches, the width of the cutter is $2\frac{1}{2}$ inches, and the plane is heavy, weighing about 10 pounds. The handle is 45 inches long, and the two grips

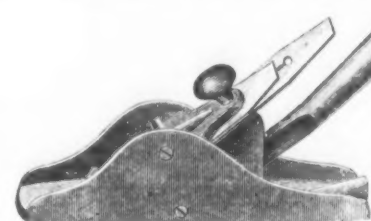
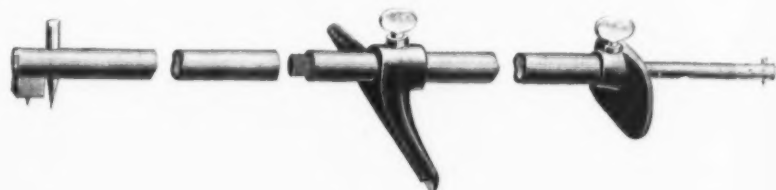


Fig. 4.—Floor Plane.

can be adjusted to suit the requirements of the individual operator. For planing floors for such purposes as bowling alleys, skating rinks, decks of vessels, &c., this tool will be found very useful. The makers assert that more work can be done with it, and with less outlay of strength, than with any other article now in the market. These tools are manufactured by the Stanley Rule and Level Co., New Britain, Conn., and No. 29 Chambers street, New York.

Combination Gauge.

We show below a combination gauge that has recently been put upon the market by Otis A. Smith, of Rockfall, Conn. It may be described as a 20-inch panel and marking gauge, the first term indicating its capacity and the latter term the uses to which it may be applied. The gauge is of metal, the bar being of hollow tubing, the sections joined by a threaded portion, as indicated in the center of the engraving. In the specimen which has been submitted for our inspection the joint is very neatly made, insuring the free passage of the cross-arm. Should a longer gauge for any reason be required, the tool could be lengthened by using additional sections of tubing combined in the same manner. The gauge being made of metal, as we have described, is likely to be far more durable than wooden gauges which it is intended to supersede, and at the same



Fale's Combination Gauge.

time it is lighter than wooden gauges. The sections of which it is composed are approximately 10 inches in length, and the gauge when taken apart packs up in a very small compass. Among the advantages to which the maker directs attention is that, the bar being round, the gauge can be set in any position necessary for making either a deep or shallow cut with the spur. The spur is adjustable by means of screws entering the end of the rod. Provision is also made at one end of the bar for inserting a pencil for marking parallels or for inscribing circles. At the opposite end of the bar a small marking gauge may be attached, thus adapting the gauge to mark two widths without the necessity of alteration. This supplementary gauge is attached by a thread on the collar shown at the right. The supplementary gauge consists of a solid bar of steel, the projection of which from the tube is controlled by a set-screw. In the end of the rod of this supplementary gauge a spur is inserted which is held by a set-screw and may be adjusted the same as the spur in the main gauge already described. The small tool becomes a very convenient adjunct for use in narrow and confined spaces. It is also provided with a second spur on the inner end, differing from the one on the outer end, as shown in the cut, by being placed as close as possible to the end of the rod, in order to mark near ledges, in rebates, &c. When it is required to use this spur, which is driven tightly in place, the adjustable spur in the opposite end is removed and the rod reversed, which is quickly accomplished. In addition to the advantages above recited, this gauge, by being divisible in the middle, affords both a long gauge and also a comparatively short one, thus giving the mechanic the opportunity to use it in that form which is best for the particular work he is doing.

The Tubal Cain Tap, Die and Bolt Co., of New York City, are the assignees of the patent right in a screw-bolt upon which right and left hand nuts may be screwed. In order to receive reversely-cut nuts, bolts have heretofore been made with reversely-threaded portions of different diameters, and also with reversed intersecting threads. These constructions are deemed objectionable, inasmuch as they either afford too little range in the adjustment of the nuts or they materially weaken the bolt. The new bolt has a single screw-thread having a full projection at opposite portions and a gradually reduced projection toward intermediate portions of the bolt. In other words, each coil of the thread is not of the same width throughout, but alternately widens and contracts. A bolt thus constructed will receive a right and left hand nut.

English Interests in Asia.

In view of the enormous interests of England, present and future, in that part of the world, says Mr. Colquhoun, in a recent lec-

ture, it will be well to sketch briefly the present situation in Eastern Asia. England's Asiatic dominions and dependencies cover more than 2,500,000 square miles. She has 270,000,000 souls under her rule, speaking more than 20 languages. Her European military strength in Asia is 70,000, with 140,000 native auxiliaries, while her naval force counts some 40 vessels. She has 10,000 miles of railway and 20,000 miles of telegraph on land in Asia and over 8000 miles of submarine cable. She has invested in her territories, either in State loans or railways under the State, over £250,000,000, besides scores of millions sterling invested in private enterprise—agricultural, commercial, industrial—which cannot be exactly estimated. Our foreign trade with these territories is over £150,000,000 annually, of which one half is with England. The trade of other Asiatic countries with Britain is over £40,000,000, of which four-fifths is English, while an enormous coasting trade, growing yearly with great strides, is mainly in our hands. The trade between Eastern Asia and Australian colonies is growing yearly, and has a great future before it. The Asiatic dominions or dependencies of Russia are $2\frac{1}{2}$ times as great as our own, containing over 7,000,000 square miles. But they have a population of only some 18,000,000, not one-fifth of our Asiatic population, scattered over this enormous region, which, in economic wealth, is poverty stricken compared to our own. It is this simple fact more than any other which makes the rapid advance of Russia toward India and China, in the present generation, so significant. From the shores of the Caspian as her base she has now thrown forward a network of communications toward Central Asia and Afghanistan. In the Amus she is making great efforts to consolidate herself and to perfect the communica-

tions between Vladivostok and Russian Siberia. Her trade with Eastern Asia, consisting almost entirely of tea from China, is trifling. French interests in Asia consist of her possession of Cochinchina, covering an area of 22,000 square miles, with a population of 1,700,000; Cambodia, 40,000 square miles, and a population of 1,000,000; Annam (including Tonquin), 200,000 square miles, with a population of about 10,000,000—in all about 13,000,000 souls. The total trade represents merely some £7,000,000 annually. Our possessions furnish us with most admirable bases for commercial expansion in Asia, such as are not now, and never can be, in the power of any other nation, unless forcibly wrested from us. We maintain along the avenues of our Eastern trade, as strategic points, the Suez Canal, India, Ceylon, Singapore, Hongkong, and lastly Port Hamilton, the last of our outposts. It cannot be gainsaid that, upon the political supremacy of England in the East, upon the possession and defense of India and our Indian possessions, depends the power to expand our trade, depends the continuance of our commercial prosperity, and, as a sequitur, the ability to support the dense and rapidly increasing population of England.

W. Hainsworth, of Pittsburgh, Pa., has invented a mold for casting rolls and similar articles. The mold is constructed with a view of avoiding the formation of longitudinal fins and of readily effecting any alteration in the form or location of the grooves or collars. The mold consists of a series of rings of varying diameters, superposed one upon the other within a metal flask in such an order as to produce a matrix of the desired internal configuration. Between these mold rings and the flask are placed a series of iron blocks, which are made of uniform thickness and of a length equal to the thickness of the mold rings. Cold water is caused to circulate around the flask for the purpose of carrying off the heat. As the mold rings are placed in position the joint is carefully luted to prevent the molten metal from entering the same.

J. R. McElligott, of Chicago, Ill., has patented a fire-door casing for furnaces, which is to supply heated air to the fire-box. The casing consists of a bottom piece, a top piece and two side pieces, each piece being made hollow and of rectangular shape. After the several parts are placed in proper position they form the square fire-door opening between them. The hollow air spaces inclosed by the plates communicate with one another, and the air received through perforations in the bottom plate rises into the side and top plates, and being thus heated is discharged into the fire-box. In order to increase this supply of air steam may be forced into the fire-box from a steam-pipe entering the top plate.

THE WEEK.

The magnificent building of the Chicago Board of Trade, including the site, cost upward of \$1,902,000. Bonds to the amount of \$1,500,000 were issued at 5 per cent. interest, payable in 50 years. The expenses of the board, including interest, insurance and a pay-roll of \$50,000, make a total of \$194,000 annually. The receipts from rents and annual dues fall short of expectations, and, there being no provision for a sinking fund, the financial situation is disheartening.

The trade of the Lake Superior region finding vent through the Sault St. Marie Ship Canal has acquired an enormous volume, which is being increased by shipments of iron ore from Wisconsin and Minnesota, as well as cattle from Montana. The movement through the canal for the season of 1885, eastward alone, is estimated at 2,700,000 tons, an amount as large as that carried by eight trunk lines last year eastward out of Chicago.

Mayor Grace, of this city, in his annual message calls attention to the immediate necessity for legislation regarding the Dock Department, heretofore supported by the issue of bonds which cannot now be issued owing to the Constitutional amendment. Although the department has an available balance of \$328,957.46, this sum will not be sufficient to meet the pressing necessity for improved wharfage facilities. The Mayor also gives the items in the final estimate for this year as passed by the Board of Estimate and Apportionment, showing that, of the \$35,739,320.59 appropriated, \$22,141,597.71 had to be set apart in consequence of "mandatory" acts of the Legislature, and that a Constitutional amendment relating to the government of municipal corporations is demanded to prevent special legislation of the character here referred to.

A dog upset an oil can in Dunlap & Co.'s hat factory, in Brooklyn, and, the contents taking fire, the entire building was destroyed; loss, \$200,000.

The city indebtedness of Buffalo is \$8,000,000, and the resources over liabilities are \$1,935,000; rate of taxation, 2.36 on valuation.

The Secretary of State has just received and sent to Mr. Ericsson, the distinguished inventor, the Grand Cross of the Order of Naval Merit recently conferred on him by the late King of Spain.

James Renwick, the architect, strongly advises against entering upon the enormous work of constructing the proposed Quaker Bridge dam as an auxiliary to the New York water supply. He believes the dam will cost at least three times the \$4,000,000 or \$5,000,000 estimated. The foundations will be 100 feet below the surface of the Croton River and about 80 or 90 feet below the surface of the Hudson River. The soil excavated is gravelly, with seams of sand and quicksand. How is the water to be kept out of the excavation with a pressure on every square foot at the bottom of at least 4000 pounds? The Croton River is to be taken care of during the construction of the dam. In the January or February thaw which carried away the original dam the volume of the Croton River by calculation was at least 80,000,000 gallons per hour. It rose at the rate of 4 feet per hour, in spite of an overflow about 100 feet wide and 24 feet high, and carried away everything between the dam and the Hudson River. What has happened once may happen again.

The fact is significant, touching the foreign demand for American manufactured cottons, that, while the export trade of England in this line of merchandise has fallen off compared with 1884, the exports of our Eastern mills have increased fully 30 per cent., reaching 210,000 packages for 1885.

The Dominion custom-house officers are vigilant in excluding from their territory prison-made barrels, and in the exercise of their authority seized a number containing pork imported from Joliet, Ill. In 1884 more than 80,000 barrels of pork imported into Canada were credited to Chicago.

It is stated on authority that it is Speaker Carlisle's intention to make the Select Committee upon American Shipbuilding and Shipowning Interests a very strong one in point of membership. To this committee are to be referred all propositions relative to American shipbuilding and shipowning interests, and the House has also given the committee authority to investigate the causes of the decline of the American foreign carrying trade. It is thought that the chairmanship of this committee should be given to Mr. Slocum, of New York, the State from whose ports more than 46 per cent. of our exports are shipped, and which receives for consumption and distribution more than 65 per cent. of our imports from foreign countries.

To encourage the proposed bridging of the Hudson River at Storm King, the Eastern manufacturers are said to have pledged themselves to send their cotton and coal by that route.

The Harlan & Hollingsworth Co., of Wilmington, Del., have contracted to build a light-draft steel boat for service in Siam. She will be shipped in sections. Although she will be used in carrying passengers and light freight, she is designed chiefly for exploring.

She is being built for an American gentleman and a brother of the King of Siam, and it is probable that they will have more boats built. She is to have a stern paddle-wheel, driven by a compound engine with 8-inch high-pressure cylinder on one side of the boat and a 14-inch low-pressure on the other. Both cylinders will have a common stroke of 36 inches. She will draw 14 inches of water and have a speed of 10 miles per hour.

The arrivals of vessels at New York from foreign ports during the year 1885 show as clearly as before how steamships of large tonnage, notably those of England, are absorbing the carrying trade of the United States. The total arrivals of all classes number 5908, which is about the same as in the previous year. Of these 2585 are British, against 1773 American; and British steamers number 1262 out of a total of 2088, of which only 218 were American. Square-rigged ships hold their own better than any other class excepting schooners, which are almost as numerous as in former years. The coastwise vessels at New York number 14,371, of which 10,428 were from Eastern ports and 3943 from Southern ports. Of the total coastwise 1661 were steamers, including 442 from Eastern ports and 1239 from Southern ports.

P. M. Arthur, head of the Brotherhood of Locomotive Engineers, is in the city by invitation to act as mediator between the Elevated Railroad Co. and the engineers, who complain of ten instead of eight hours work per day.

William Baylies Crocker died after an illness lasting eight months, on Sunday last, at his residence in this city, aged 49 years. He was a member of the firm of Crocker Brothers, one of the largest iron houses of New York. He was born at Taunton, Mass., and completed his education at the Brown University, from which he was graduated in 1856. Immediately after that he came to this city, and, engaging in the metal business with his elder brother, George A. Crocker, he was taken into partnership in the firm of Bussing, Crocker & Co., which afterward became Crocker Brothers. He leaves a wife and two sons.

The Clyde shipyards announce a reduction of 10 per cent. on time-work and 12½ per cent. in piece-work in all classes of labor employed, to take effect January 21.

Work on the steel cruiser Atlanta, at the Morgan Iron Works, in this city, is being pushed with vigor.

The Legislature of South Carolina has just repealed an act of 1872 exempting factories from taxation for a period of 10 years from the time of their beginning operations. This action, it would appear, is due to the belief that sufficient time has been allowed capitalists to invest their money in these industries, and that they are now on such a basis as to need no further encouragement or support from the State.

The *Drovers' Journal* contains a review of the live stock trade of Chicago for the year 1885. The receipts of cattle, hogs and sheep are shown to have increased largely over those for the previous year, and the value of all the live stock received is estimated at about \$200,000,000.

The grain trade of Baltimore for the past year shows a heavy decrease. Of wheat only about 5,500,000 bushels were exported, against 16,500,000 bushels the previous year, but of corn there were shipped 13,718,000 bushels, which is an increase of 8,000,000 bushels. Prospects for the coming year are much better.

An unusually large proportion of wheat has been in warehouse at various points during the past season, at a heavy cost. In Chicago alone the average cost of storage each day during the summer season was about \$20,000, including insurance and interest accounts. The magnitude of the loss has not only made buyers on the other side of the Atlantic stand aloof, believing that it would soon be necessary to offer it to them at lower prices, but it has invited bear speculation, thus adding to the weight.

Our imports of foreign wool at this port during the year 1885 comprised 110,478 bales, valued at about \$4,900,000, surpassing the total of the previous year some 34,000 bales.

A review of the industrial growth and resources of South Carolina, covering a period of five years since the United States census of 1880, shows that the capital employed in manufacturing has increased from \$11,205,895 to \$23,367,510, while the products have increased from \$16,738,008 to \$38,403,257; 240 miles of railroad have been built, at a cost of \$2,000,000; the people have added in five years \$66,300,000 to the total wealth of South Carolina.

A dispatch from Tamatave, dated December 20, says: "The treaty of peace between France and Madagascar, it is reported, cedes territory to France, surrenders the northern ports which France originally claimed, and gives the French Government supremacy over the foreign relations of Madagascar."

A man-of-war has raised the German flag over the Marshall and Gilbert groups of islands in the Pacific Ocean and established a protectorate. The population numbers about 25,000, and, under the instruction of

American missionaries, have become civilized. One of the secretaries of the American Board says that, although the mission had done their utmost to foster trade with the islands, and naturally sought to direct that trade into American channels, they allowed the natives to govern themselves. He did not think the German Government would in any way interfere with their work outside of diverting the trade of the islands into German channels.

The German navy consists of 13 ironclads, 14 armored gunboats for coast defense, 9 cruiser frigates, 10 cruiser corvettes, 5 cruisers, 4 unarmed gunboats, 8 dispatch-boats, 10 training ships, 1 surveying vessel, 2 transports, 12 vessels for harbor service, and 10 pilot vessels and fireships.

An experiment is being tried at Portsmouth, in England, with the object of determining the practicability of applying liquid fuel as a steam generator to men-of-war, and with fair prospects of success. The fuel consists of creosote, which is procurable at a penny a gallon.

The Pennsylvania and Lehigh Valley railroad companies have closed contracts with the Eastman Freight Car Heater Co. for the use of their automatic heating and ventilating appliances in the transportation of perishable freight.

The secretary of the Milwaukee Chamber of Commerce, in his report for 1885, refers to the diminished importance of that city as a wheat market, and finds satisfaction in the proof thus afforded that the great region directly tributary to Milwaukee, instead of increasing its production of wheat, has now capital enough to diversify its agriculture.

According to a Government report just issued the value of the coal mined in the United States in 1884 was \$143,760,000, while the silver and gold product for the same year amounted in round numbers to scarcely \$80,000,000.

There is nothing in the statistics of railway traffic, remarks the *Railroad Gazette*, to indicate a great increase in railroad profits in the coming year, though there is much to indicate that they will be decidedly larger than the extremely unsatisfactory ones of most of this year or of the 12 months ending with August last. The good times of 1880 came after three successive bountiful harvests and when there had been an enormous increase in our chief exports. Now exports are, as they have been since the first half of 1881, unusually light, and one of the chief crops is exceptionally poor. On the other hand, the recent depression was never so severe as that after the panic of 1873, and it is reasonable to suppose that we shall recover from it more quickly. The development of other industries has been so much more rapid than the growth of agriculture, and the population has increased so greatly, that the crops and the prices of grain and cotton and the exports are relatively less important than they were six or eight years ago.

Charleston, S. C., has 60,145 inhabitants, against 39,984 in 1880, an increase of over 20 per cent. The white population is 27,605 and the colored 32,540.

The Empire of Turkey is falling to pieces rapidly ever since the close of the Russian war. The fact is evident in every department of the public service. A correspondent of the *London News*, writing from Constantinople, says: "The stagnation which reigns in business is of the most terrible kind. Branches of trade which were almost monopolies of Turkey have been lost. The transit trade to Persia has gone. The trade with Bulgaria might have been kept if the Turks would have allowed Constantinople to have been a port of transshipment. As they insisted upon merchandise intended for that Province paying Turkish customs duties, in which case the goods would have to pay twice over, merchants naturally sent their wares direct to Bulgaria, to the ruin of those merchants who had been engaged in the importation of goods for Bulgaria. The effect, I may mention incidentally, has been to the benefit of German and Austrian manufacturers, whose goods are sent down the Danube. The trade had hitherto been largely in the hands of English and French manufacturers. The intention of Turkey was, of course, merely to benefit itself and to spite the Bulgarians; the effect has been to deprive Turkey of any advantage whatever from commerce with the richest portion of the Empire. The measure of the encouragement given to trade may be taken from the fact that the local post which was suppressed some four or five years ago, lest it should facilitate conspiracy, still remains abolished. Let Londoners in business try and realize what such a fact means."

Building operations in New York City during the year just closed were on an enormous scale, the total cost of all for which plans were filed being estimated at \$44,214,000, against \$41,461,208 for the previous year, an aggregate rarely surpassed in the history of the city. If the plans for the Equitable Life Assurance Society are included, descriptive of the contemplated new building on Broadway and Cedar street, the total estimated cost of new buildings for which plans are filed will be swelled to over \$46,000,000. In speaking of the year's building operations Superintendent D'Oench said there had been a large increase in the

number of dwelling houses and flats of moderate cost, and a marked falling off in the number of tenement-houses, both of which are desirable features, indicating an improvement in the general average condition of the inhabitants.

The Maritime Provinces of the Dominion all report a very large decrease in the total shipping tonnage during the past year, particularly in that owned in New Brunswick. In that Province the tonnage is now 288,257, or 19,505 tons less than at the close of 1884. The present tonnage of Nova Scotia is 541,070, a decrease of 2785 tons. The tonnage of Prince Edward Island is 36,040, a decrease of 3173 tons. The returns show a total decrease in the three Provinces of 25,463 tons.

The schooner J. E. Atkinson, from Mobile, reports that in a gale off Hatteras she was saved only by towing bags of oil astern. In an article on "The Use of Oil at Sea," by Lieut. John P. Holditch, R. N. R., the author says: "The results I have obtained are these: Fish or colza oil only is of any good; it does not matter how dirty it is so long as it is not thick. Paraffine is too thin; paint oil too thick. Running before a gale naturally expends much more oil than 'laying to'—you have so much more water to oil. Carefully expended, 1 quart in three hours for running, 1 pint in four hours for laying to, will be sufficient. The means I used was a canvas bag (No. 6), with large holes stabbed with a needle. I have heard of a bundle of oakum being saturated with oil, and then put in a coarse gunny bag, which I think would admit of a thicker oil being used for the time. The place for towing is undoubtedly forward, not aft. Whether in head-reaching oil could be used successfully I cannot say, but I doubt it. When running dead before the wind, tow from each cat-head, and the ship is as safe as anything can be at sea."

The Union Iron Yard, at Buffalo, has closed a contract with the Anchor Line of Lake steamships for a new iron steamship to be built from plans furnished by G. B. Mallory, of New York, of the following dimensions: Length between perpendiculars, 320 feet; width of beam, 40 feet; depth of hold, 23 feet; with seven water-tight compartments, single bottom, except in the compartment occupied by the machinery, which will have a second or water bottom with space to contain about 100 tons of water. She is to be completed next season.

Capt. Thomas Wilson, of Cleveland, Ohio, has contracted with the Globe Shipbuilding Co. for a steel steamer to be 264 feet long over all, 250 feet between perpendiculars, 38 feet beam, and 24 feet depth of hold, with four iron pole masts.

The Standard Oil Co. are perfecting their plan to force natural gas by Worthington engines from the Bradford field to Buffalo, a distance in a direct line of about 65 miles, and another line to Philadelphia and Baltimore, about 300 miles. The general manager says gas will also be piped to Cleveland, and pipe will be laid in Youngstown as soon as spring opens.

The estimates of the statistician of the Department of Agriculture for 1885 for the principal cereals are completed, and the aggregate bushels are as follows, in round millions: Corn, 1936; wheat, 357; oats, 629. The area of corn is 73,000,000 acres; of wheat, 34,000,000; of oats, 23,000,000. The value of corn averages nearly 33 cents per bushel, and makes an aggregate of \$635,000,000, \$5,000,000 less than the value of the last crop. The decrease in the product of wheat is 30 per cent., and only 17 per cent. in valuation, which is \$275,000,000. The valuation of oats is \$180,000,000. The production of all cereals is larger than that of any former year.

A single Chicago packer ships 125 carloads of refrigerated beef per day for European markets. The cars are kept cool by ice and the meat is transferred into steamers chilled in the same manner. The chances of such cargoes are varying. Not infrequently it happens that an entire consignment is spoiled by the failure of the ice supply through some unexpected delay in the passage.

It may be remembered that Gould's American cable was leased to the Western Union on a 5 per cent. guarantee of its \$14,000,000 stock. According to recent calculations this guarantee, together with the running expenses and cost of repairs, have not only eaten up all the receipts from the business of the cables, but from \$200,000 to \$300,000 besides.

It is said that an enormous aggregate of cotton, sugar and other products is being carried by New Orleans factors and merchants awaiting a rise in prices.

The superintendent of motive-power in the Pennsylvania Railroad Co. has placed a steam steerer on their ferry-boat Baltimore, and is contemplating putting them on the rest of their fleet, as a safeguard against collision.

The customs receipts at the port of Montreal for 1885 were \$6,682,701, as against \$6,787,721 for 1884, showing a decrease of \$105,020.

Three full sets of galvanized wire rigging have been ordered from the Roebing Wire Works for vessels building in Bath, Me.

The Cramps, of Philadelphia, will soon have two iron steamers in course of construction, one for the Southern Pacific Co.,

Morgan Line, and one for the Erie Railroad ferry service between New York and Jersey City. These two contracts will amount to at least \$500,000.

Conflicting reports are circulating in regard to the proposed Maryland and Delaware Ship Canal, one being that the Pennsylvania Railroad Co. expect soon to get possession of the franchise.

Six men were killed and as many more hurt by the explosion of a boiler at the Gulf City Oil Mills, Mobile, Ala. The accident seems chargeable indirectly to foaming, which prevented the fireman from knowing that the water was low.

Lord Lorne, in one of the reviews, discusses at some length the relations between the United States and Canada. He does not think that the United States has very great attractions for Canadians, or that the feeling in favor of annexation is either general or strong. His observations have led him to believe that Canadians are moderately desirous of more intimate trade relations with the people of the United States, but are not prepared to make very great sacrifice in any direction to obtain them. The tendency of Canada, Lord Lorne suggests, rather than openly indicates, is toward independence.

A decision rendered by the United States Supreme Court at Washington in the case of the Illinois Central, Mobile and Ohio and other railroads is favorable to State control.

A ladle which facilitates the transfer of molten metal has been patented by H. Schulze-Berge, of Rochester, Pa. The discharge opening is made at the corner formed between the side and bottom of the ladle. This portion of the vessel is fitted with a conical seat designed for the reception of a conical stopper which is provided with a longitudinal bore. The stopper is connected to a shaft or axle surrounded by a coiled spring and operated by a hand lever. The spring holds the stopper tightly to its seat, its tension being regulated by a nut. When it is desired to discharge the molten metal the lever is turned so as to bring the bore of the stopper in line with the discharge orifice. To close the ladle the orifice and stopper bore are brought out of line. Thus it will be seen that the molten metal does not enter between the stopper and its seat, and consequently neither of these parts is exposed to wear by the metal.

The *Railway Age* summarizes as follows the record of new railroad mileage in 1885: "When the year 1885 opened very little was expected of it in the way of railway building. The record for the year as we now present it shows that this assumption was far from being correct, and that while the extent of new mileage added is less than in 1884 and very much less than in several previous years it is by no means insignificant. The total length of main line, not including second track, sidings or renewals, laid in the United States during 1885 was 3113 miles. This is about 700 miles less than the new mileage of 1884, and it is less than in any year since 1878, when the total was but 2687 miles, while in 1875 the record of new constructions reached only 1711 miles. The new track laid this year is distributed as follows: New England States, 4 lines, 13½ miles; Eastern and Middle States, 26 lines, 281.9 miles; Middle and Western States, 31 lines, 464 miles; Southern States, 44 lines, 727.4 miles; Missouri belt, 21 lines, 542.5 miles; Kansas belt, 24 lines, 828.6 miles; Colorado belt, 2 lines, 14 miles; Pacific belt, 14 lines, 249.9 miles; total, in 34 of the 47 States and Territories, 166 lines, 3112.8 miles. The work done has been largely on branches and extensions of moderate length, and has not included any very large lines, such as in previous years have helped greatly to swell the total. In New England and the East almost no new track has been added. The principal activity has been in the Southern States and in the belt between the Missouri River and the Pacific States and Territories."

F. W. Dick and J. Riley, of near Glasgow, Scotland, are the patentees of a regenerative furnace for making steel. Two small and two large regenerative chambers are placed in a square around the main furnace. These chambers consist each of a vertical cylindrical iron or steel shell lined with fire-brick. Near their upper ends the chambers communicate with the furnace by means of flues, so arranged that the air flues from the larger chambers enter immediately above the gas flues from the smaller chambers. The air flues are directed downward into the throats or spaces in which the gas and air mix and through which they enter the furnace. The flues from the bottom ends of the chambers are formed in the brickwork upon which the chambers are supported. These lower flues are connected to reversing valves. The air enters the open top of one of the valve casings, while the gas is led to the top of the other by a pipe or duct. Each regenerative chamber is provided with two doors, to give access for the purpose of removing the brick checker-work inside.

The Akron Iron Co., of Akron, Ohio, have patented a die for drawing, compressing and polishing cold metal bars. It is formed of an inner steel part and an outer wrought-iron jacket. The steel part of the die is provided with a central bore, the front of which is flaring, while its rear is cylindrical and tangential to the curved part, except at the end, which is also slightly flaring. In this form of opening there is space for lubricating material in the front part around the bar to be drawn, while the gradually-decreasing contraction of the opening inward to the cylindrical part facilitates the operation of drawing, as the contraction is least where the force of compression is greatest. The rear flare is to prevent breaking of the die from the expansion of the metal bar when released from compression in drawing it through the die.

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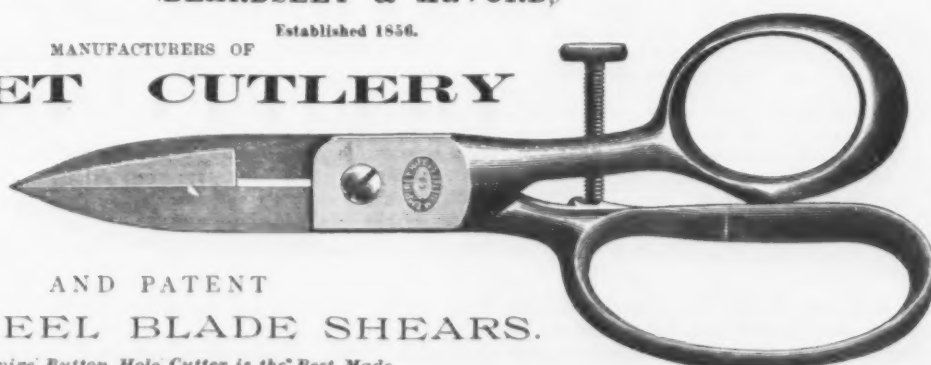
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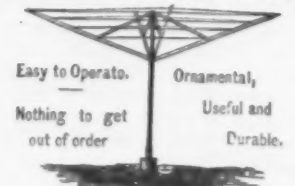


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Annual Review of the Metal Market for 1885

(Concluded from page 9, December 18.)

Tin.

The year was inaugurated with a better feeling, Straits opening in London at £74. 10/ and soon rising to £77, and in New York at 17 1/4¢, the visible supply on this side being 2400 tons, while in England and Holland it was 15,618, against 15,988 in 1884, and 15,221 in 1883. Shipments from the Straits settlements to the United States during the first 11 months of 1884 had been 57,379 piculs, against 106,231 in 1883. London, however, soon reacted to £74. 5/, recovered to £76. 5/, and wound up the month at £74. 7/6. The December deliveries in England and Holland had been 1800 tons, against 2080 the previous year, while our own December consumption had been only 750 tons. The month closed at 16 3/4¢. The joint consumption in Europe and the United States in 1884 had been 35,400 tons, against 34,260 the previous year and 32,000 in 1883.

February opened with a visible supply on this side of only 2000 tons, causing the price to advance to 17 1/4¢, and later on to 17 3/4¢, while in London it rose during the month steadily to £78. 15/, the statistical position inspiring confidence. The total shipments to Europe and America from the Straits and Australia in January had been 2360 tons, against 2140 in 1884 and 2185 in 1883. The European deliveries were 2170, against 2572 and 1998.

In March the speculators for a rise in London and New York made a first great attempt to advance the market, but it proved rather premature. The price opened at £78. 12/6 and 17 3/4¢, with a visible supply here of 2300 tons, February deliveries here having been only 550 tons, whereas in Europe they were 2610, against 2308 the previous year. While the closing price here was 17 3/4¢, it was £78. 12/6 in London. Two circumstances had checked an improvement for the moment—the continuation of the Franco-Chinese war and the bad weather here.

In April the strained relations between England and Russia threw the merchandise market in London into temporary confusion, which the chief operator there availed himself of to buy a little more Tin, and when, later on, the war cloud was dispelled, the metal seemed ready for a serious rise. On this side the visible supply on April 1 proved to be 2300 tons, consumption in March having been 600 tons, while the total visible supply between Europe and America was 14,981 tons, against 14,530 and 17,100 in 1884 and 1883 respectively. Opening at £78. 12/6 and 17 3/4¢, the markets closed the month at £79. 10/ and 18 3/4¢.

In May the peaceful outlook in Europe on the one hand, and the better disposition to speculate in merchandise on the other, chiming in with the manipulations for a rise in Tin, carried the improvement in the latter to £82 and 19 3/4¢. Here the visible supply had been swelled to 2900 tons on the 1st of May, after an April consumption of 600 tons, winding up with the visible supply in Europe on May 31 with 15,318 tons, against 15,057 in 1884. A peace settlement between France and China having been arrived at also, there was evidently nothing left to obstruct the onward course of the speculative movement in London in June. The latter opened at New York with a visible supply of 2750 tons, after a May consumption of 600 tons.

The price in London on June 1 stood £81. 5/ and at New York 19 3/4¢, while at the close of the month the price was £84 and 21 3/4¢, respectively. A momentary stoppage in the Suez Canal transit had even been availed of to help the advance in London; nay, even the American statistics had been tampered with and distorted to play into the hands of the Anglo-American speculative rings.

On July 1 the price stood £84 in London and 21 3/4¢, in order to advance during the month to £84. 15/ and recede to the opening figure, while in New York the closing figure was 22 1/4¢. The net import into the United States during the fiscal year ended June 30 had been 10,667 tons, against 11,583 in 1884, and shipments from the Straits this way during the first five months only 960 tons, against 1470.

August opened with a visible supply here of 2300 tons, against 2250 the previous month, and a July consumption of 900 tons, against a June one of 600. The repeated complaints about garbled statistics and the proofs furnished that they had been at two openings intentionally falsified at length stirred up misgivings about the entire Tin speculation, and the trade resolved to operate no further than the actual current demand warranted; in fact, every body not immediately interested set his face against a metal so disreputably manipulated, causing a general feeling of indifference and apathy not favorable to the maintenance of a wholly artificial price. Such being the case, the metal was allowed to drop in all August to £80. 5/ in London, and 21¢ here. Meanwhile the supply for the American market had gone on swelling steadily, so that it stood on September 1 at 2850 tons, against 2650, September 1, 1884, after an August consumption of 900 tons, and the price wound up dull on September 30 at this point at 20 3/4¢, while in London, which had transferred part of its stock this way, the price was more than upheld, and closed at £82. It should here be remarked, however, at once, that the general suspicion in which the metal was held by the trade in Europe and here, dating from September-October, caused consumption on both sides of the Atlantic to fall off some 3000 tons in the aggregate, thus furnishing a striking proof of the detrimental effect which the manner in which the upward movement had been engineered had exercised on the actual use of the metal. Thenceforward the latter was characterized by inherent weakness, although at times the speculative element succeeded in advancing the price a trifle. Net import into the United States during the first seven months, 4860 tons, against 5642 in 1884.

On October 1 the visible supply on this side was 2945 tons, against 2150 on October 1, 1884, and during October the price declined in London to £80. 10/ and in New York to 20 1/4¢. Net import into the United States

the first eight months, 14,386,789 lb, against 16,075,921 in 1884. Visible supply in Europe and America end of October, 14,135 tons, against 14,408 in 1884, and 14,685 in 1883. October deliveries in London and Holland, 2670, against 3222 and 2120. In November the sudden and important advance in Copper and general improvement in metals gave the manipulators in London a welcome pretext for pushing Tin higher once more, causing a rise to £83. 10/ at the close of the month, while here we sluggishly followed, and wound up at 20 3/4¢, but the supply on this side had by this time become inconveniently liberal, so that on December 1 we had a visible supply of altogether 3440 tons, against 2585 in 1884 and 2390 in 1883. Import into this country first 10 months, 19,761,081 lb, against 20,786,365 in 1884. In December the metal elicited but slight active interest on both sides of the Atlantic, and the market was allowed to finally settle down to £82. 15/ and 20 3/4¢.

Price of Straits Tin at New York.

| | |
|------------------------------|------------------------------|
| Jan. '84. 18 1/4¢ @ 18 1/4¢ | Jan. '85. 17 1/4¢ @ 17 1/4¢ |
| Feb. '84. 18 1/4¢ @ 18 1/4¢ | Feb. '85. 17 1/4¢ @ 17 1/4¢ |
| Mar. '84. 18 1/4¢ @ 18 1/4¢ | Mar. '85. 17 1/4¢ @ 17 1/4¢ |
| Apr. '84. 18 1/4¢ @ 18 1/4¢ | Apr. '85. 17 1/4¢ @ 17 1/4¢ |
| May '84. 18 1/4¢ @ 18 1/4¢ | May '85. 17 1/4¢ @ 17 1/4¢ |
| June '84. 18 1/4¢ @ 18 1/4¢ | June '85. 17 1/4¢ @ 17 1/4¢ |
| July '84. 18 1/4¢ @ 18 1/4¢ | July '85. 17 1/4¢ @ 17 1/4¢ |
| Aug. '84. 18 1/4¢ @ 18 1/4¢ | Aug. '85. 17 1/4¢ @ 17 1/4¢ |
| Sept. '84. 18 1/4¢ @ 18 1/4¢ | Sept. '85. 17 1/4¢ @ 17 1/4¢ |
| Oct. '84. 18 1/4¢ @ 18 1/4¢ | Oct. '85. 17 1/4¢ @ 17 1/4¢ |
| Nov. '84. 18 1/4¢ @ 18 1/4¢ | Nov. '85. 17 1/4¢ @ 17 1/4¢ |
| Dec. '84. 18 1/4¢ @ 18 1/4¢ | Dec. '85. 17 1/4¢ @ 17 1/4¢ |

Lead.

The price of Common Domestic Lead opened in January at \$3.67 1/2 in New York, and Soft Spanish at £11. 10/ in the London market, the metal being considered favorably situated from a statistical point of view. The chief operator here as early as the first month of the year endeavored to cause an advance, but the demand being slack, and the severity of the season militating against an appreciation, the market flattened again after some 3000 tons had changed hands at \$3.55 @ \$3.70, the closing price for the month being \$3.62 1/2.

Lead Production in the United States.

| | 1883. | 1884. |
|---|---------|---------|
| Utah..... | 29,000 | 28,000 |
| Nevada..... | 6,000 | 4,000 |
| Colorado..... | 70,557 | 63,165 |
| Montana..... | 5,000 | 7,000 |
| Idaho..... | 6,000 | 7,500 |
| New Mexico..... | 2,400 | 6,000 |
| Arizona..... | 1,500 | 2,700 |
| California..... | 1,700 | 1,600 |
| Missouri, Kansas, Illinois and Wisconsin..... | 21,600 | 19,676 |
| Virginia..... | 300 | 256 |
| Total..... | 143,967 | 139,907 |
| Of which argentiferous..... | 123,137 | 119,965 |
| Soft..... | 21,800 | 19,932 |

February was even duller than January, leading to sales of only 2000 tons, and after a few slight fluctuations the month wound up at the previous closing figures of 3 3/4¢. Spanish pig-lead exportation during the first 11 months of 1884 had been 108,227 tons, against 116,049 in 1883 and 106,783 in 1882. Soft Spanish closed in London at £10. 10/.

In March, St. Louis and Chicago reported large sales of Corroding Lead to White Lead manufacturers, whereas Lead manufacturers in this city still held back, there being no indications of briskness for the spring trade. Hence only 2500 tons sold, but the closing figure was slightly higher, \$3.70. Spanish export in 1884 had been 116,203 tons, against 128,489 in 1883 and 115,168 in 1882. London closed at £10. 7/6. While in Europe Lead began to stiffen again in April on the strength of the reviving demand for China after the French blockade had ceased, it displayed even greater sluggishness here, the spring campaign proving a partial disappointment and the manufacturers' competition here keeping low the price of goods in the line. In this manner only 1000 tons sold during the month, the price meanwhile keeping steady, \$3.70, while London recovered to £10. 15/. Spanish January export, 10,365 tons, against 11,721 and 10,407. Although May brought a little more business, 2000 tons selling, the market lacked strength, and the month wound up at \$3.60, whereas London improved to £10. 17/6. Spanish export first two months, 20,707 tons, against 21,076 and 20,416. German production in 1884, 94,809 tons, against 90,732 in 1883.

As early as June advices from the West prognosticated that there would in all likelihood be a falling off in Domestic Lead production during the year of at least 12,000 tons, and on the strength thereof the chief operator here re-entered the market, but the demand at the time not warranting much of an advance of a durable kind, the movement proved rather premature. The price nevertheless temporarily rose to \$3.85, 3000 tons changing hands. Spanish export during the first quarter, 31,175 tons, against 31,336 in 1884 and 29,471 in 1883. London, after touching £11, receded to £10. 17/6.

In July a better demand at length came to the assistance of the speculation for a rise, and 5000 tons sold, the price gradually reaching \$4.15. The cholera in Spain meanwhile caused the London price to rise to £12. Production in England from British Ores in 1884 had been 40,075 tons, against 43,419 in 1883. Lead imported and obtained from Foreign Ores amounted to 132,829, against 118,521. Total export in 1884, 37,631, against 42,848 in 1883. Available for British consumption in 1884, 135,273 tons, against 119,092 in 1883. Some 2000 tons of Richmond Lead becoming released from attachment, the market became unsettled in August and declined from \$4.25 it had reached to \$4.15, consumers withdrawing for the time being, as the fall demand gave as yet no signs of setting in. Sales in August were thus confined to 1500 tons. Spanish export during the first four months, 42,138 tons, against 42,491 in 1884 and 40,933 in 1883. In September the fall demand, though perhaps less active than usual, manifested itself sufficiently to lead to the sales of 3000 tons to consumers, the price remaining firmly sustained at 4 1/4¢. In London, on the contrary, the price dropped to £11. 5/, the export from Spain, instead of decreasing, as had been expected, being larger than in 1884. Richmond Lead selling freely to arrive in October at 4 1/4¢, and business suddenly falling off on the spot, our market became demoralized and gave way from 4 1/4¢ to 4¢. Export from Spain during the first seven months, 71,138 tons, against

67,468 in 1884. London kept steady in October at £11. 5/. English statistics showed that since Lead had ruled so low 149 mines had shut down in England, throwing out of employ 40,000 miners.

November was an important month, inasmuch as it became patent beyond dispute that in all the year 1885 consumption had in this country largely outrun production of Pig Lead, and statistically the metal obtained such a strong position that the price advanced materially without being assisted by speculation to speak of. On the spot and afloat the sales summed up at New York some 5000 tons, and the price rose to \$4.60 on the spot, large lines. In London the price rose to £12. 7/6 on the theory that political troubles were impending in Spain, a surmise not verified by subsequent events in that country, and this advance, therefore, was only short-lived. Spanish export, eight months, 70,440 tons, against 75,695. In December London receded to £12. 2/6, while in New York nothing of further interest occurred, the price on the spot being \$4.67 1/2 and February delivery \$4.57 1/2, at which figures the market closed.

PRICE OF COMMON DOMESTIC LEAD AT NEW YORK—CENTS PER POUND.

| | 1883. | 1884. | 1885. |
|----------------|---------------|---------------|---------------|
| January..... | 4 1/4 @ 4 1/4 | 3 5/8 @ 3 5/8 | 3 5/8 @ 3 5/8 |
| February..... | 4 1/4 @ 4 1/4 | 3 5/8 @ 3 5/8 | 3 5/8 @ 3 5/8 |
| March..... | 4 1/4 @ 4 1/4 | 3 5/8 @ 3 5/8 | 3 5/8 @ 3 5/8 |
| April..... | 4 1/4 @ 4 1/4 | 3 5/8 @ 3 5/8 | 3 5/8 @ 3 5/8 |
| May..... | 4 1/4 @ 4 1/4 | 3 5/8 @ 3 5/8 | 3 5/8 @ 3 5/8 |
| June..... | 4 1/4 @ 4 1/4 | 3 5/8 @ 3 5/8 | 3 5/8 @ 3 5/8 |
| July..... | 4 1/4 @ 4 1/4 | 3 5/8 @ 3 5/8 | 3 5/8 @ 3 5/8 |
| August..... | 4 1/4 @ 4 1/4 | 3 5/8 @ 3 5/8 | 3 5/8 @ 3 5/8 |
| September..... | 4 1/4 @ 4 1/4 | 3 5/8 @ 3 5/8 | 3 5/8 @ 3 5/8 |
| October..... | 4 1/4 @ 4 1/4 | 3 5/8 @ 3 5/8 | 3 5/8 @ 3 5/8 |
| November..... | 4 1/4 @ 4 1/4 | 3 5/8 @ 3 5/8 | 3 5/8 @ 3 5/8 |
| December..... | 4 1/4 @ 4 1/4 | 3 5/8 @ 3 5/8 | 3 5/8 @ 3 5/8 |

Spelter.

The low price of 4 1/4¢ @ 4 1/4¢ in December, 1884, compelled several producers out West to suspend operations, and, although the demand is but moderate, the price of Common Domestic advanced in January to \$4.45 @ \$4.50, Silesian meanwhile selling at \$4.50, and in London at £14. What little demand there had been in January fell off again in February, and the price receded to \$4.30. March brought little relief, the demand remaining slack and the price being barely sustained at 4 1/4¢ @ 4 1/4¢, while London gave way to £13. 17/6. Breslau meanwhile reported an active and firm market. A listless state of affairs again prevailed in April at 4 1/4¢, London meanwhile dropping to £13. 5/ under heavy Calamine shipments from Spain.

Spelter Production.

| | 1884. | 1883. | 1882. | 1881. |
|--|---------|---------|---------|---------|
| Rhine District & Belgium..... | 130,522 | 123,891 | 119,138 | 110,980 |
| Silesia..... | 76,116 | 70,495 | 68,811 | 66,407 |
| Great Britain..... | 29,359 | 28,661 | 25,581 | 24,419 |
| France & Spain..... | 15,311 | 14,671 | 18,073 | 18,358 |
| Poland..... | 4,164 | 3,739 | 4,400 | 4,000 |
| Austria..... | 2,965 | 2,967 | 3,199 | 2,539 |
| Total..... | 257,767 | 244,228 | 239,259 | 226,783 |
| To which we add the production in the United States..... | 31,414 | 32,920 | 30,147 | 30,000 |
| Total..... | 292,181 | 277,148 | 269,406 | 256,783 |

* Estimated.

May was again intensely dull, causing our market to drop to \$4.16. Although Spain had shipped no less than 10,049 tons of Calamine the first two months, against 4402 in 1884, and 1800 in 1883, London recovered to £13. 17/6. The official German returns showed production in 1884 to have been 125,276 tons in that country, against 116,954 in 1883.

There being no revival in the demand here in June, Spelter was allowed to drop to \$4.10. In Silesia, in spite of low prices, one of the leading mining companies was able to declare on May 31 a 6 1/2 dividend. Spanish Calamine shipments showing for the first quarter 6899 tons increase, London receded to £13. 7/6.

July opened at 4 1/4¢. It was soon intimated per cable that an earnest effort was being made to bring about a solid syndicate on a rational basis on the Continent, the ball being put in motion from Breslau, and, although no particular sanguinity prevailed on the subject on this side, a decidedly better feeling obtained. The price, under a slightly reviving demand, rose to 4 1/4¢ in London; it improved to £13. 15/. While from 25,516 tons of Domestic Ores England and Wales produced 9908 tons of smelted Zinc, worth £152,835, in 1884, simultaneously English importation was £1,224,737.

In August all was ready for the Continental syndicate to go into immediate operation. The Upper Silesian Spelter smelting works owners met at Beuthen early in the month and unanimously agreed not to increase their output for four years to come, but to restrict the same to what it was during 1884, Rhinish Westphalian makers acceding to the compact. The basis of production, being the one of 1884, thus laid down as a guidance, was 1,522,320 cwt. of 50 kg. for Silesia, the Silesian Co. on shares alone figuring with 432,180 cwt. and Rhinish Westphalia with 755,600 cwt., of which Stolberg alone with 285,000. The world's production in 1884 was stated to have been altogether 5,755,340 cwt., equal to 257,767 tons of 2240 lb, the countries named having, as shown above, contributed 2,277,920 cwt., or about 40 %. After the agreement was signed the Silesian Spelter market stiffened, and Hohenlohe Spelter sold, "to arrive," at 13 30 marks per 50 kg. In England the news that an agreement had at length been arrived at was received with approbation by smelters, English production being 585,000 cwt. annually. Spanish Calamine export began to be less excessive, being 15,833 for the first four months, against 11,742 in 1884 and 11,150 in 1883. London advanced to £14. 7/6. The average price of Spelter in the London market in 1883 was shown to have been 9 1/2 % lower than the average of 1882, and 22 % lower than that of the last 25 years. In 1884 the metal still further declined 4 1/2 %. In Breslau the average price in 1884 was 28.02 marks, against 29.42 in 1883. Up to the middle of August the price had given way to 26 marks, in order to recover to 26.60 per 100 kg. when it became known that the restriction of output had been agreed to on all hands on the Continent. Former Spelter syndicates invariably proved failures, because from their inception

they had been clumsily got up and badly conducted afterward. They are better understood now, and as overproduction in all branches of industry has been characteristic of our time and is acknowledged to require other than half measures to check it, syndicates are better managed nowadays, by better business men. Hence, the success of the international Steel Rail, Welsh Tin Plate, Continental sugar, various Prussian Iron syndicates and the one of which we have just given the details. Spelter was at once placed on a more solid footing; confidence in it revived, and it is to be hoped that in 1886 good business men may regulate the status of Copper, other metals and leading articles of merchandise generally, and thus place the producer of raw material once more in a more prosperous condition. In September nearly all English makers joined their Continental colleagues in the agreement, binding themselves, under a penalty of £13 1/2 ton, not to increase their production the next 3 1/2 years. Excluded from the agreement there still remained several Belgian firms, with a production of about 6000 tons, and the small production of Austria and Poland, amounting to some 6500 tons. The Prussian Government returns show that Silesia mined, in 1884, 516,357 tons of Zinc Ores, against 560,554 in 1883; other districts in Prussia, 115,878 tons, against 110,112, the total 1884 output being 631,235 tons, against 676,796 the previous year, or 45,561 tons less. The import of Zinc Ores into Prussia via Antwerp was 150,400 tons, against 171,981 in 1883, showing a decrease of 21,581 tons. The amount of Spelter produced in 1884 in Rhinish Westphalia was 46,378 tons, in Belgium, 82,624; together, 129,002, corresponding, at 40 % average, to 322,500 tons of Ore. Export of Calamine from Spain during the first seven months, 22,935 tons, against 22,161 in 1884, and 23,757 in 1883. The market here continued moderately active at 4 1/4¢ @ 4 1/4¢ during the month of September, and steady in London at £14. 7/6, Silesian being worth in New York 4 1/4¢. In October the price of domestic did not vary, but Silesian advanced to 4 1/2¢ @ 5¢; London declined to £14. 2/6. Import of Spelter into the United States during the first eight months 1,965,940 lb, against 2,880,191 in 1884. November was quiet, but firm, at New York at \$4.45 @ \$4.60, domestic, and Silesian, \$4.90 @ \$5. London rose to £14. 15/ and receded to £14. While in New York December developed no new features and the price remained nominally as before, speculation on the Continent caused a corresponding advance of 15/ @ 17/6 in London. Silesian was not procurable at New York under 5¢.

Lowest and Highest Price of Common Spelter—Cents per Pound.

| | 1882. | 1883. | 1884. | 1885. |
|------------|-----------|---------------|---------------|---------------|
| Jan..... | 5 1/4 @ 6 | 4 1/2 @ 4 1/2 | 4 1/4 @ 4 1/4 | 4 1/4 @ 4 1/4 |
| Feb..... | 5 1/4 @ 6 | 4 1/2 @ 4 1/2 | 4 1/4 @ 4 1/4 | 4 1/4 @ 4 1/4 |
| March..... | 5 1/4 @ 6 | 4 1/2 @ 4 1/2 | 4 1/4 @ 4 1/4 | 4 1/4 @ 4 1/4 |
| April..... | 5 1/4 @ 6 | 4 1/2 @ 4 1/2 | 4 1/4 @ 4 1/4 | 4 1/4 @ 4 1/4 |
| May..... | 5 1/4 @ 6 | 4 1/2 @ 4 1/2 | 4 1/4 @ 4 1/4 | 4 1/4 @ 4 1/4 |
| June..... | 5 1/4 @ 6 | 4 1/2 @ 4 1/2 | 4 1/4 @ 4 1/4 | 4 1/4 @ 4 1/4 |
| July..... | 5 1/4 @ 6 | 4 1/2 @ 4 1/2 | 4 1/4 @ 4 1/4 | 4 1/4 @ 4 1/4 |
| Aug..... | 5 1/4 @ 6 | 4 1/2 @ 4 1/2 | 4 1/4 @ 4 1/4 | 4 1/4 @ 4 1/4 |
| Sept..... | 5 1/4 @ 6 | 4 1/2 @ 4 1/2 | 4 1/4 @ 4 1/4 | 4 1/4 @ 4 1/4 |
| Oct..... | 5 1/4 @ 6 | 4 1/2 @ 4 1/2 | 4 1/4 @ 4 1/4 | 4 1/4 @ 4 1/4 |
| Nov..... | 5 1/4 @ 6 | 4 1/2 @ 4 1/2 | 4 1/4 @ 4 1/4 | 4 1/4 @ 4 1/4 |
| Dec..... | 5 1/4 @ 6 | 4 1/2 @ 4 1/2 | 4 1/4 @ 4 1/4 | 4 1/4 @ 4 1/4 |

Tin Plates.

The year opened quiet at New York at \$4.40 @ \$4.60. Coke Tin shipments from England to the United States in 1884 had been 4,237,200 cwt., against 4,308,840 in 1883, and 4,291,040 in 1882. The demand being light, there was a decline of 5¢ per box. February was a little more active, but brought no improvement. In March large shipments from Liverpool to the West on through bills of lading interfered somewhat with the usual spring demand here, causing a continued dull market here at \$4.40 @ \$4.50. Liverpool meanwhile advanced 3d. @ 6d. In April the chartering of steamers by the British Government caused a scarcity of freight room, and there was a firmer feeling on this side; as the demand failed to come forward, however, the price wound up lower, \$4.37 1/2 @ \$4.45. May was dull again at \$4.30 @ \$4.45. Greater firmness was exhibited in June at Liverpool in response to the advance in Tin, the market remaining dull here. Coke remained easy at \$4.30 @ \$4.40. Net import into the United States 11 months of fiscal year, 458,414,141 lb, against 466,852,355 in 1884. Total export from England to all quarters first five months 127,949 tons, against 126,021 in 1884, and 106,690 in 1883. At the quarterly meeting held in July at Swansea 300 works were represented, or more than three-quarters of the whole Welsh works, the substance of the agreement being to stop work during a six-month one week per month. The agreement went into operation July 6, it having been agreed, further, not to work from 4 o'clock on Saturday afternoon of each week till 6 o'clock a. m. on Monday. Another stipulation agreed to was that no new works were to commence operations during the six months, nor any then idle be revived. Plates thus being in better shape and a good consumptive demand coinciding, July witnessed an improvement to \$4.60 @ \$4.65, Coke. Net import into the United States during the fiscal year ended June 30 226,190 tons, against 226,390 in 1884. August was quiet and easier once more at \$4.50 @ \$4.62 1/2. September brought more business and a better feeling, the price advancing to \$4.55 @ \$4.70. Stocks at Liverpool were reported greatly reduced. In October Welsh makers extended the agreement to July, 1886, which imparted greater strength to both sides of the Atlantic, assisted, moreover, here by the light stocks on this coast. Net import into the United States first eight months of calendar year 362,698,241 lb, against 337,519,170 lb in 1884. Coke closed the month at \$4.57 1/2 @ \$4.70. In November a good business was done, Coke closing at \$4.52 1/2 @ \$4.67 1/2. The good demand subsiding somewhat in December, holders exhibited a more yielding disposition here, less so in England. Import into the United States during the first 10 months, 437,522,737 lb, against 412,426,598 lb in 1884. Stocks being nominally light in the United States toward the close of the year, in spite of more liberal arrivals during the course of it, consumption thus proved to have made good headway, superinduced no doubt by the low prices ruling. It was, at any rate, an encouraging feature.

Mahogany.

Five years since, it is asserted, the imports of mahogany to this country amounted to only 500,000 feet annually. At present the volume of trade in this material is not less than 10,000,000 feet annually. A comparison of the figures will indicate the rapid growth of this wood in popularity. A short time since it was considered an expensive wood, but with the increased consumption its cost has been reduced, so that at present it is not much dearer than native walnut or cherry. Mahogany is not only fashionable wood, but it is the most reliable wood known to commerce. It is unequal for doors, house-trimming, furniture, or for any purpose where a hardwood is desired. It does not warp or check; neither does the sun fade it, but, on the contrary, it brings out its rich color. Time, which destroys other woods, only serves to increase the value of mahogany. An incident of its introduction into England early in the eighteenth century is worth relating. A West Indian captain brought a few planks to his brother, Dr. Gibbons, of London, who was erecting a house on King street, Covent Garden. The doctor knew something of wood, and instructed his master workman to use the planks in some of the interior work of his house. The workman said they were too hard, but the good doctor, having a cabinet-maker named Wallaston, turned to him and half jokingly asked if he could not make a candle box to adorn his library. The cabinet-maker, like some others of his craft, knew no such word as fail, and accordingly essayed the task. As the result of his skillful labor he brought the doctor a box, the finish of which outshone all the other furniture. The fame of it grew, and, as a result, the permanence of mahogany as a fashionable wood was secured. Mahogany is found in the West India Islands, and also in Mexico. Some time between the years 1521 and 1540 Cortes and his companions, after their conquest of that country, used it in the building of the ships in which they sailed on their voyages of discovery. The color of mahogany when freshly cut is of a light tone, and in finishing it this shade should be preserved. The finisher should not be permitted to use any stain upon the wood, as this detracts from its effect and interferes with one of the most beautiful operations of nature. The owner of a house finished in mahogany may notice from month to month the deepening shades of color in the wood, which mellow in the sun's rays, and take on a richer glow. This increases year after year, until the wood is resplendent in

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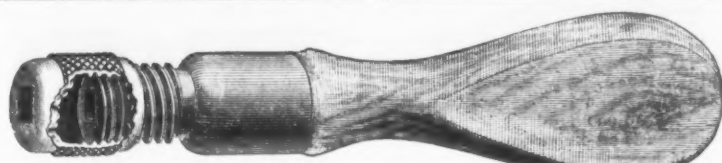
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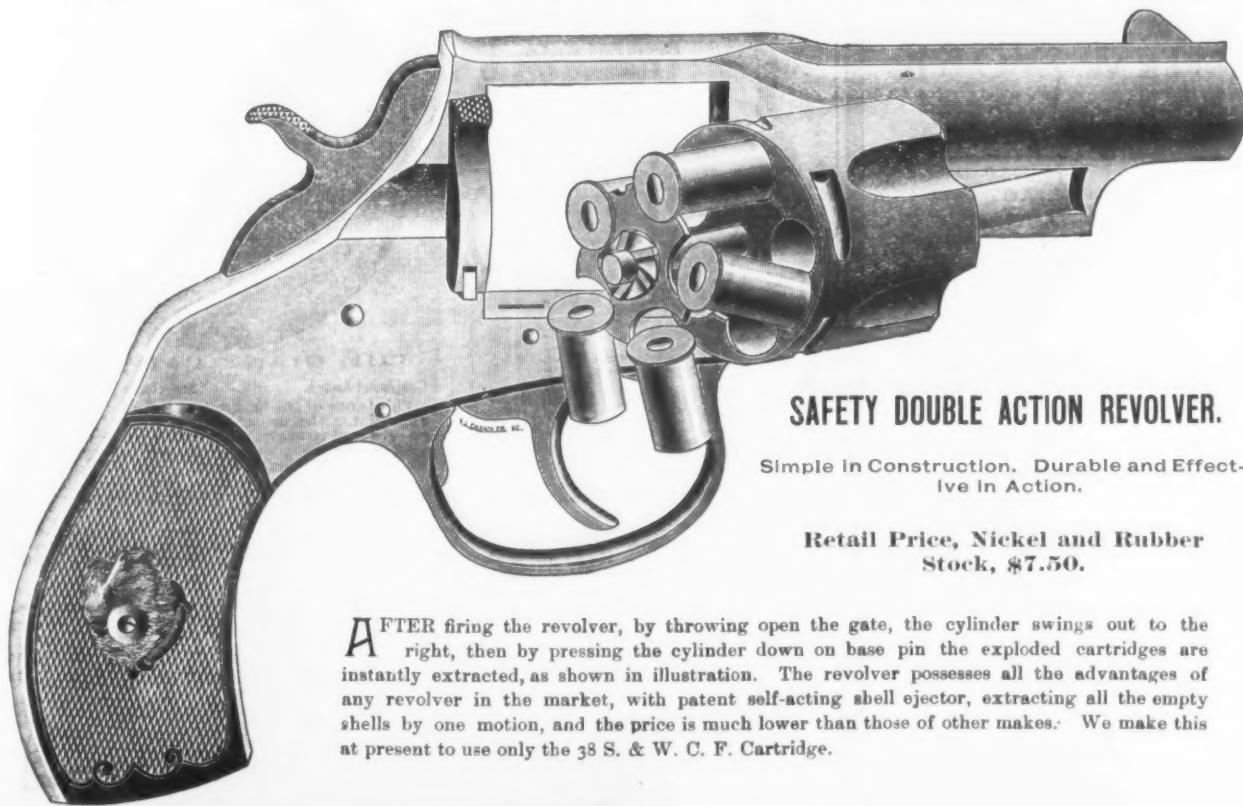


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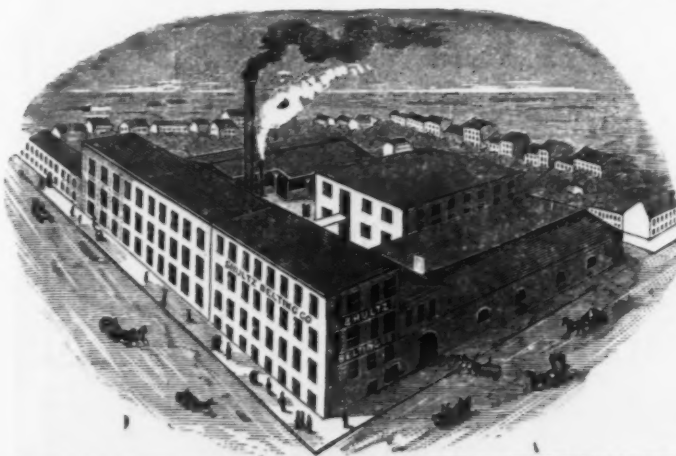
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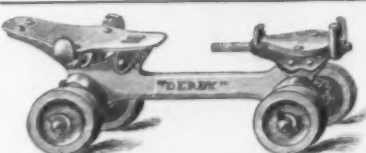
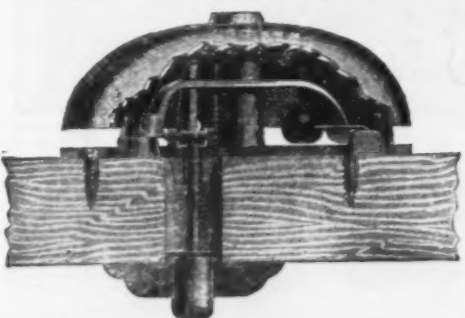
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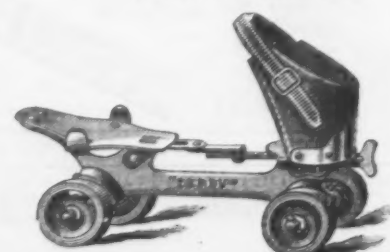
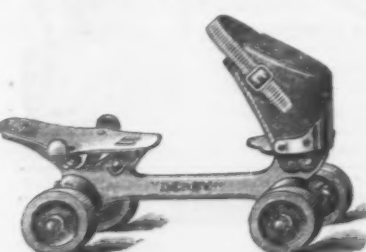
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Manufactured by SISE, GIBSON & CO.

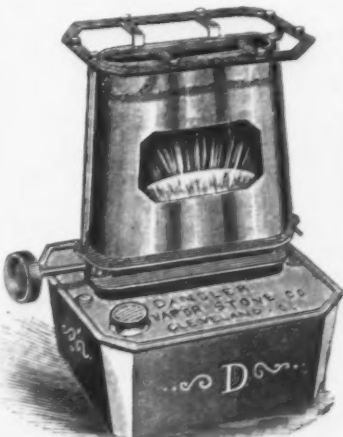
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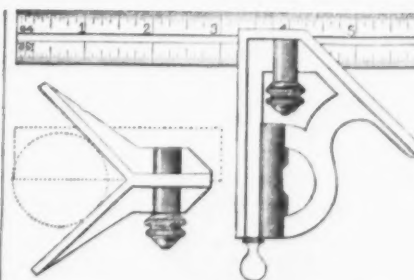


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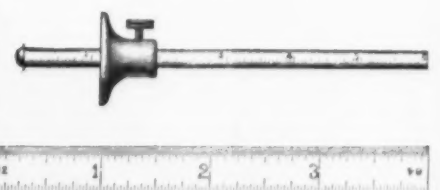
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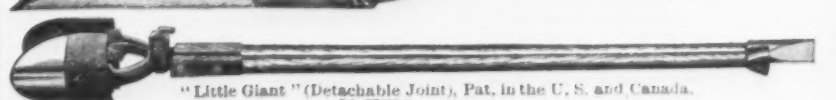
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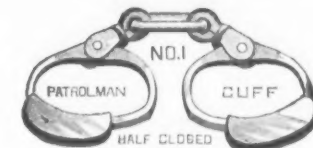
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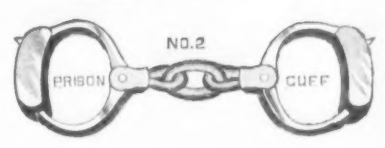


NO. 1

PATROLMAN

CUFF

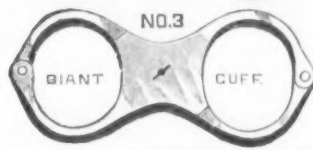
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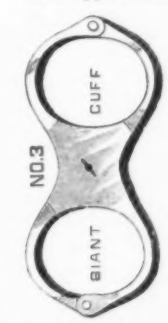


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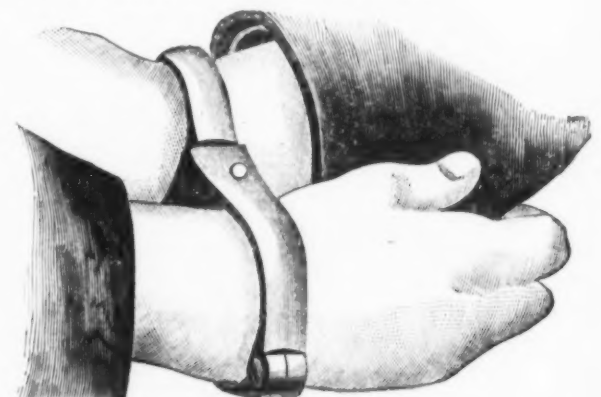
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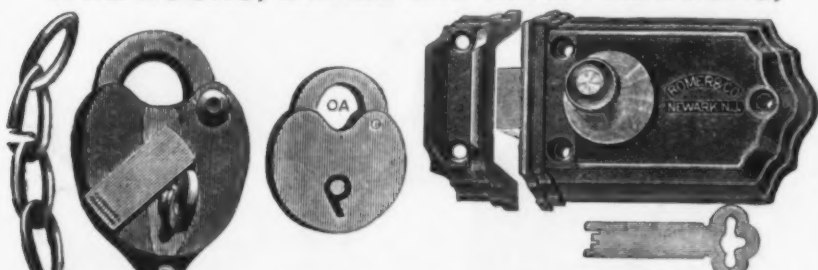
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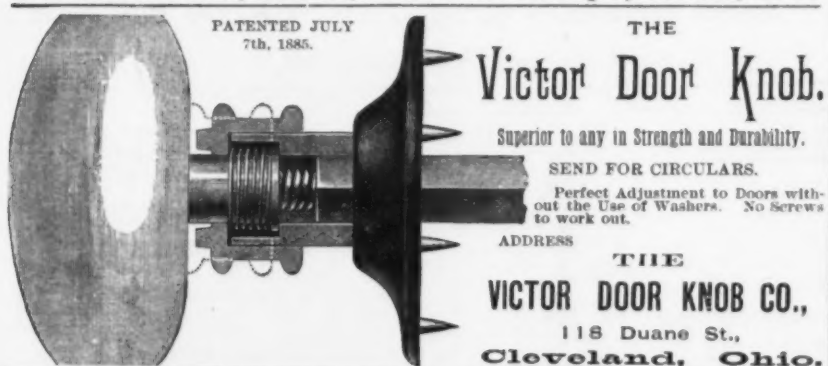
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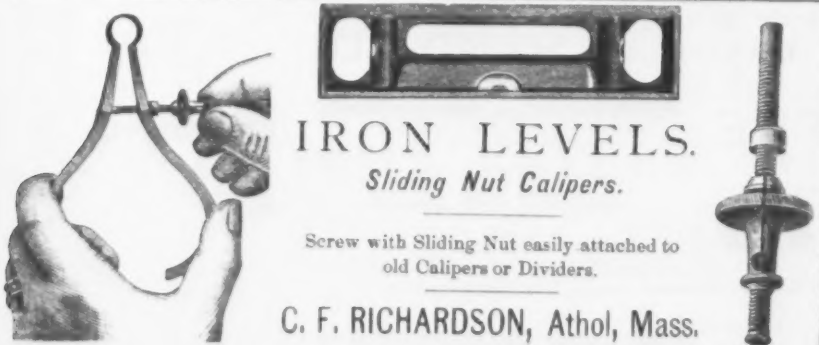
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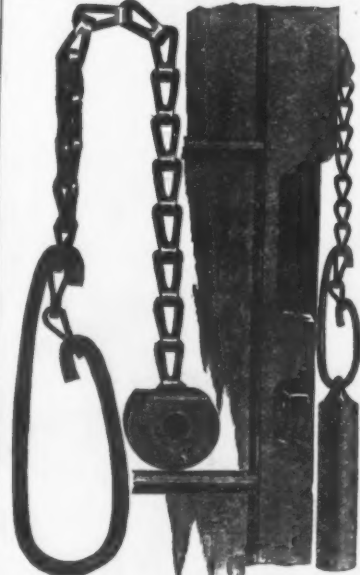
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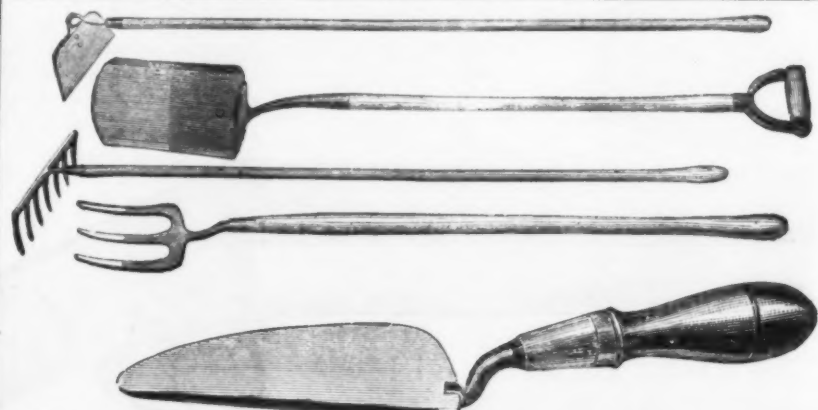


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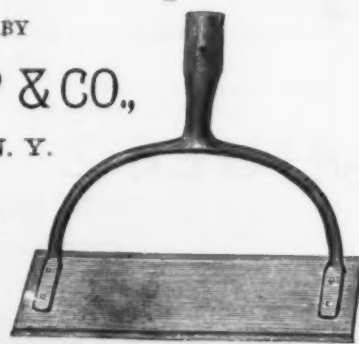
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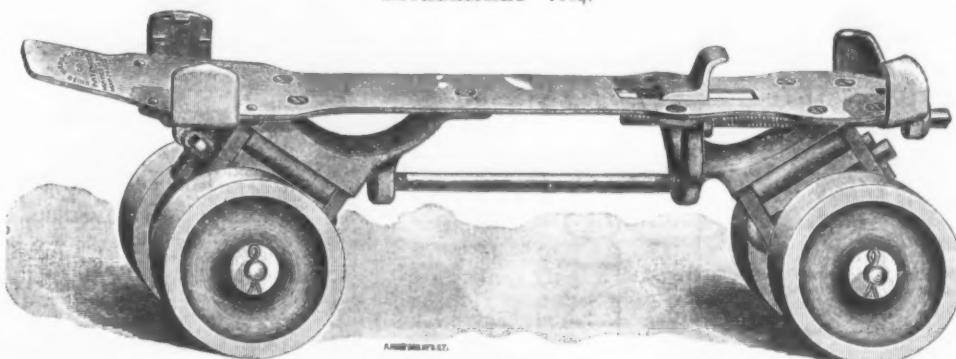
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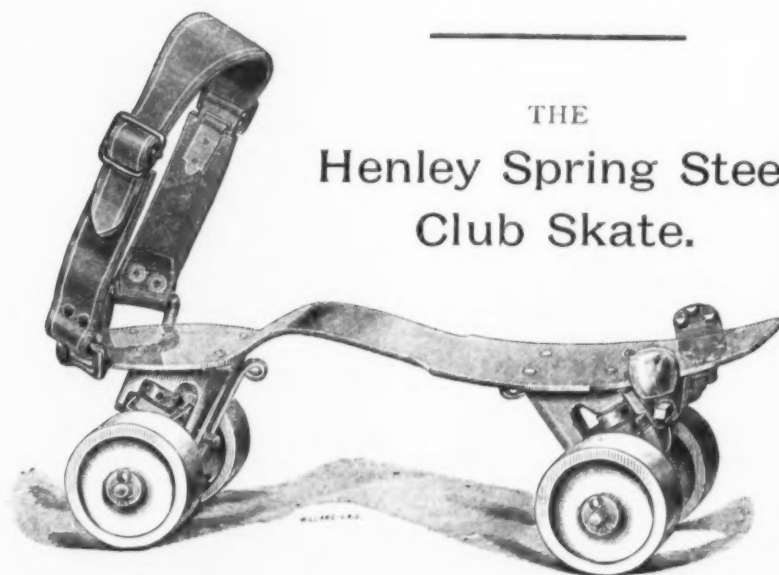
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Patentee and Manuf'r.

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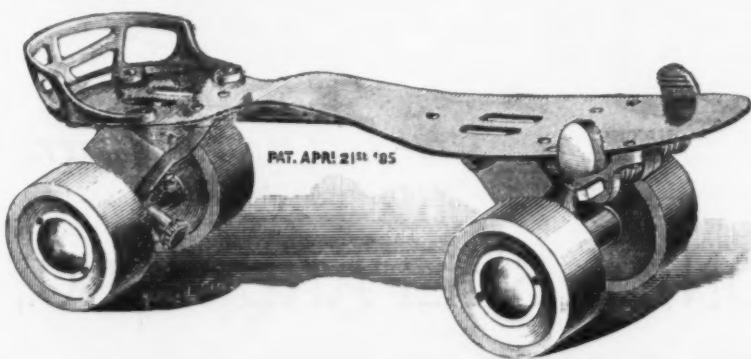
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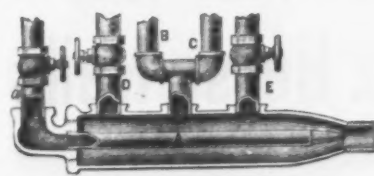
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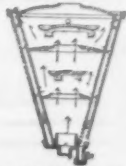


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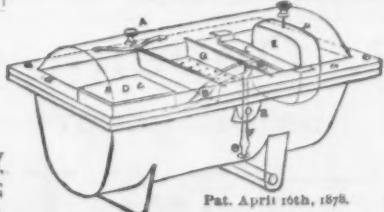
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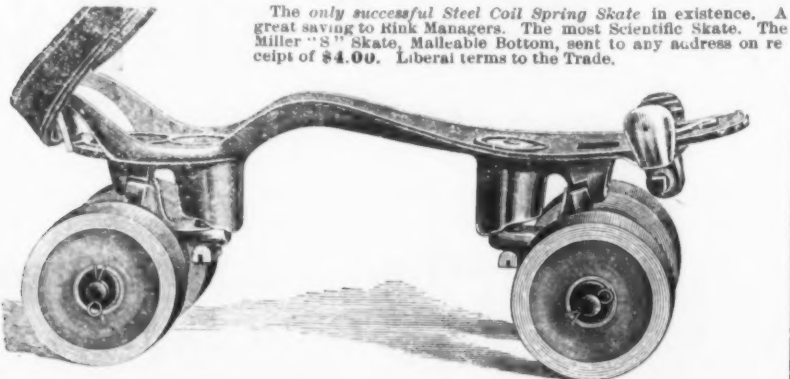
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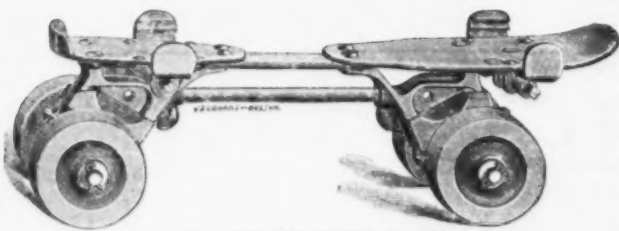
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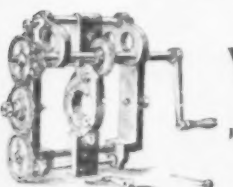
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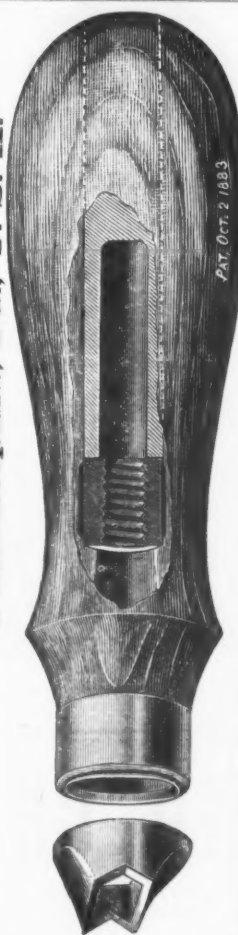
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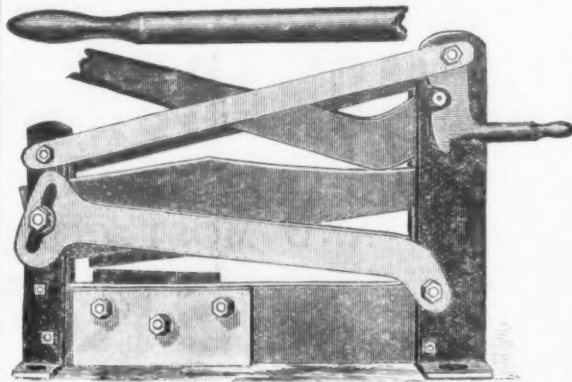
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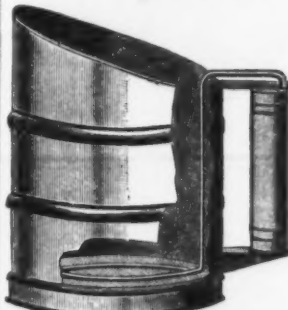
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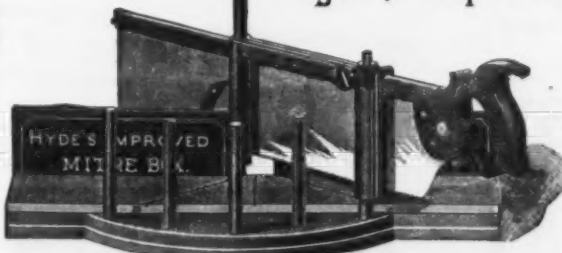
SOLE MANUFACTURERS,

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THE BUFFALO STAMPING WORKS,
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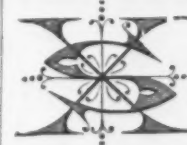
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Are drawn from the best Swedes Iron Rods only. They are hot forged and cold-pointed, rendering them tough, stiff and easy driving, and are warranted

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KRAUT CUTTERS.

| | | |
|-----------|---|-------------------------------------|
| No 1..... | 1 | knife, with box, 8 x 26, per dozen. |
| " 2..... | 2 | knives, " " " " |
| " 3..... | 3 | " " " " |
| " 4..... | 4 | " " " " |
| " 5..... | 3 | " " 9 x 30, " " |
| " 6..... | 2 | " " 12 x 36 each. |
| " 7..... | 3 | " " " " |
| " 8..... | 4 | " " " " |
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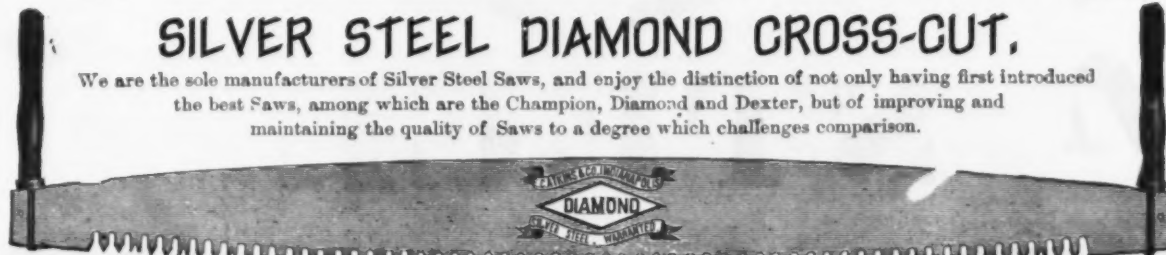
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We are the sole manufacturers of Silver Steel Saws, and enjoy the distinction of not only having first introduced the best Saws, among which are the Champion, Diamond and Dexter, but of improving and maintaining the quality of Saws to a degree which challenges comparison.



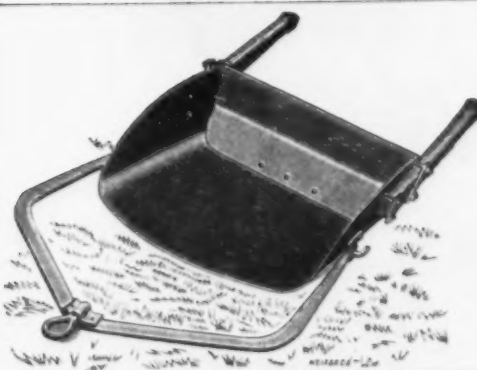
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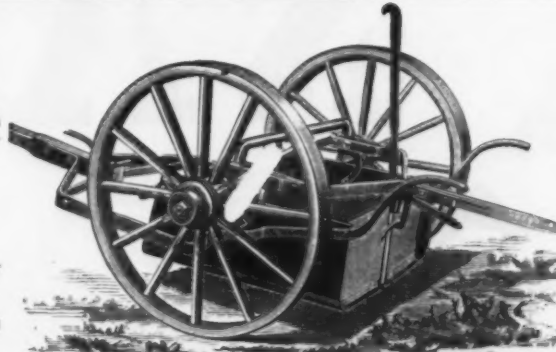
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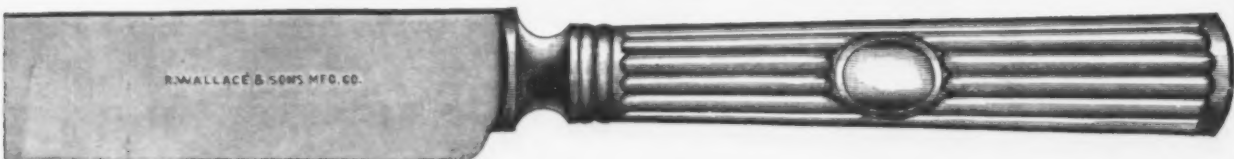
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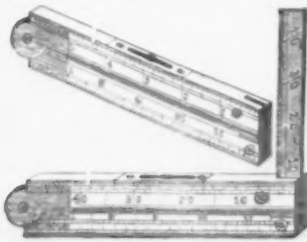


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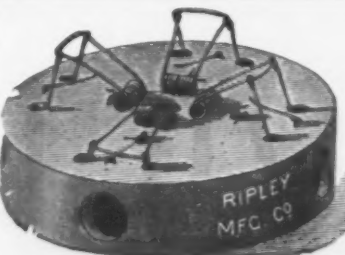


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STEPHENS & CO.
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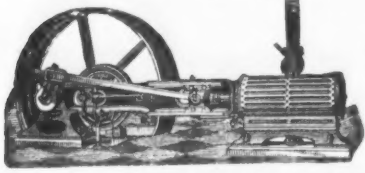
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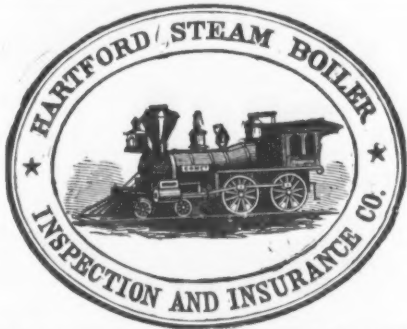


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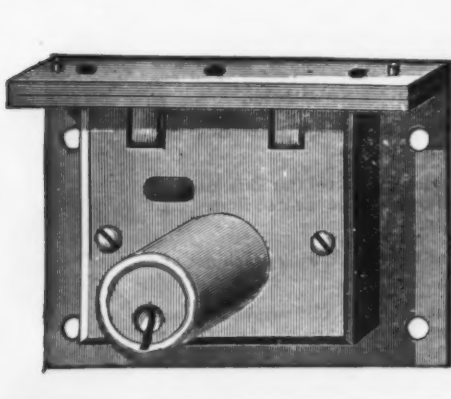
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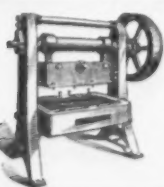
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Send for Circular and Price-List.
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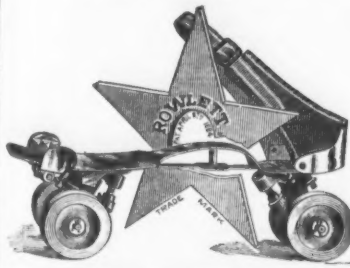
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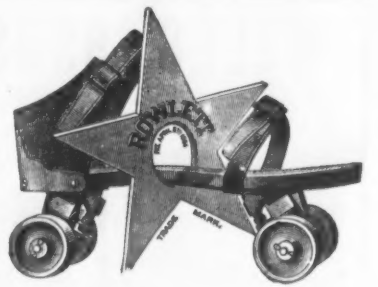
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THE CROWN ROLLER SKATE.

IT LEADS THEM ALL.

The Only Skate in which the Tension can be Adjusted on the
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The Only Skate which can be Taken Apart and Put Together
Again Without the Use of a Single Tool.



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The Crown Skate gives universal satisfaction, and
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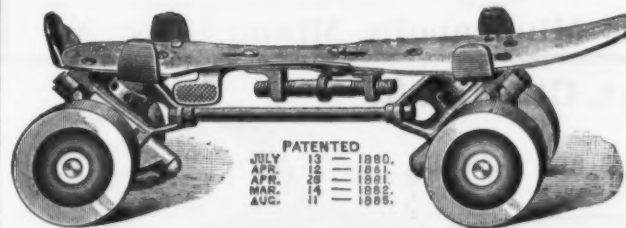
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Send for Our Elegant New Illus-
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"VINEYARD"
Roller Skates.

The VINEYARD "all Lever Clamp" has no superior.

A LARGE AND COMPLETE STOCK CONSTANTLY ON HAND AT FACTORY PRICES.

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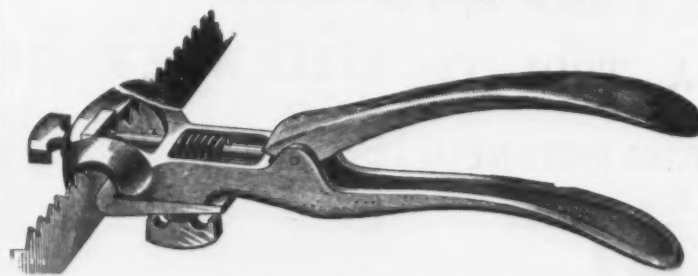
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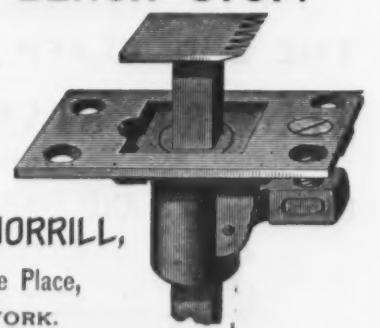
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DESCRIPTIONS AND PRICES.

| Card No. | Size and Price Per Card. |
|----------|--|
| 1 | A—BAR IRON, Weight of Round, Square and Flat, per Foot, and Tire per set. Western Classification and Prices of Extras on American, Norway and Swedes. B—BAR STEEL, all Kinds and Sizes with Prices of Extras, Horse and Mule Shoes, Size, Weight, No. in Keg. Toe Calks. Cut Nails, List of Extras. |
| 2 | A—CUT TACKS, Exact size cuts. Length. Number in a pound. B—LARGE HEAD CARPET TACKS, Gimp and Lace Tacks. Hungarian Nails, Hob Nails, Blued and Tinned, American and Swedes. Exact size cuts shown of all the above. |
| 3 | A—SHOE NAILS. Cigar Box Nails. Copper Tacks, Double-Pointed Tacks and Cuts. Glaziers' Points and Cuts. Barbed Blind Staples. B—PATENT BRADS. Finishing Nails. Blued Clout Nails. Tinned Clout Nails. |
| 4 | A—IRON WOOD SCREWS. B—IRON WOOD SCREWS (continued). Iron Machine Screws. |
| 5 | A—STANDARD CARRIAGE BOLTS. B—STANDARD CARRIAGE BOLTS (continued). Plow Bolts. |
| 6 | A—MACHINE BOLTS. B—STANDARD TIRE BOLTS. Round and Flat Head Stove Bolts. |
| 7 | A—PHILADELPHIA CARRIAGE BOLTS. B—PHILADELPHIA CARRIAGE AND TIRE BOLTS. |
| 8 | A—SQUARE AND HEXAGON NUTS. Wrought Washers. Size of Bolt, size of Hole, Width, Thickness, number in 100 pounds. B—COACH OR LAG SCREWS. Superior and Norway Axle Clips. |
| 9 | A—BRIGHT SCREW HOOKS. Belt Hooks. Blake's Belt Studs. B—BRIGHT SCREW EYES. Gate Hooks and Eyes. Cornice Hooks and Eyes. |
| 10 | A—PLATE CASTERS AND BED CASTERS. B—WROUGHT HOOKS AND STAPLES. Trap Door Rings. Hasps and Staples, and Staples only. |
| 11 | A—SAWS, Hand, Panel and Rip. Combination and Back. Disston's and W. M. & C.'s corresponding numbers and "Our Brand." B—SAWS, Back, Compass, Pruning, Kitchen, Butcher's Bow and Blades, Framed Wood Saws and Blades. |
| 12 | A—CHISELS. Slicks, Socket Framing, Socket and Tanged Firmer, Corner. B—Turning Chisels and Gouges, Socket and Tanged Firmer Gouges. |
| 13 | A—Cast Steel Augers and Bits. Boring Machine Augers. Jennings' Auger Bits. B—Bit Stock Drills. Gimlet Bits, German Pattern, Double Cut and Countersink. Center Bits, Clark's Expansive Bits. |
| 14 | A—HAMMERS. Ads Eye, Bell Face, Joiners', Steel Face and Claw, Riveting, Farriers', Blacksmiths', Machinists', Engineers'. B—HAMMERS. Tack, Masons', Sledges, Miscellaneous. HATCHETS. Shingling, Lath, Half, Claw, Broad or Bench, Hunters'. |
| 15 | A—FILES. Bastard, Mill, Flat, Hand, Half-Round, Round, Square, Knife, Warding. Second Cut, Mill, Flat, Hand, Half-Round, Smooth, Flat and Hand. B—FILES. Smooth, Half-Round, Round, Cabinet, Pit Saw, Hook Tooth, Gin Saw, Band Saw, Cant, Taper, Stubb's Taper. Rasps, Cabinet, Wood, Shoe, Horse. |
| 16 | A—Rubber and Hemp Packing. Gaskets or Rings. Rubber Hose. B—Leather and Rubber Betting. |

SAWS.

| DISSTON'S NO. 3. | PANEL, HAND & RIP. | W. M. & C. NO. 12. |
|------------------|--------------------|--------------------|
| Length In. | List. | Cost. |
| 16 | | |
| 18 | | |
| 20 | | |
| 22 | | |
| 26 | | |
| 28 | | |

| DISSTON'S NO. 7. | PANEL, HAND & RIP. | W. M. & C. NO. 25. |
|------------------|--------------------|--------------------|
| Length In. | List. | Cost. |
| 16 | | |
| 18 | | |
| 20 | | |
| 22 | | |
| 26 | | |
| 28 | | |
| 30 | | |

| DISSTON'S NO. 8. | HAND AND RIP. | W. M. & C. NO. 26. |
|------------------|---------------|--------------------|
| Length In. | List. | Cost. |
| 26 | | |
| 28 | | |

| DISSTON'S NO. 9. | HAND AND RIP. | W. M. & C. NO. 27. |
|------------------|---------------|--------------------|
| Length In. | List. | Cost. |
| 26 | | |
| 28 | | |
| 30 | | |

| DISSTON'S NO. 12. | HAND AND RIP. | W. M. & C. NO. 28. |
|-------------------|---------------|--------------------|
| Length In. | List. | Cost. |
| 26 | | |
| 28 | | |

| OUR BRAND. | | | | |
|----------------------|-------|-------|------|-------|
| PANEL, HAND AND RIP. | | | | |
| Length In. | List. | Cost. | Job. | Sell. |
| 16 | | | | |
| 18 | | | | |
| 20 | | | | |
| 22 | | | | |
| 26 | | | | |
| 28 | | | | |

| SPECIAL C. S. PANEL AND HAND. | | | | |
|-------------------------------|-------|-------|------|-------|
| Length In. | List. | Cost. | Job. | Sell. |
| 16 | | | | |
| 18 | | | | |
| 20 | | | | |
| 26 | | | | |

| COMBINATION HAND. | | | | |
|-------------------|-------|-------|------|-------|
| Length In. | List. | Cost. | Job. | Sell. |
| 26 | | | | |

| DISSTON'S NO. 1. | BACK. | W. M. & C. NO. 3. |
|------------------|-------|-------------------|
| Length In. | List. | Cost. |
| 10 | | |
| 12 | | |
| 14 | | |
| 16 | | |

for noting in pencil—List, Cost, Jobbing and Selling Prices—as in sample of Card 11-A, shown in the center of this page. Cards A and B of each number are mounted on each side of a tough, heavy card-board, especially adapted for this use, which is further protected on the four edges by being *cloth bound*. Two-thirds of them are 3 x 13½ inches. This size has been found convenient for hanging on a pilaster finish, or any other narrow surface, without hiding the goods. To hang or chain up each card there is firmly inserted through the top and center a nickel-plated eyelet about ⅜ inch inside diameter. They will be sent, *charges prepaid*, on receipt of price.

DESCRIPTIONS AND PRICES.

| Card No. | Size and Price Per Card. |
|----------|---|
| 17 | A—WINDOW GLASS. List Prices and No. Lights per Box. Also ruled columns for other Wholesale and Retail rates. B—SASH, DOORS AND BLINDS. List Prices. |
| 18 | A—HINGES, Strap, Light and Heavy. T. Light, Heavy and Extra Heavy. Hinge Hasps, Screw Hook and Strap. B—SCREW HOOK AND EYE HINGES. Barn Door Hangers, Checked Back, Kidder's, Anti-Friction, Wrought Frame. Barn Door Stay Rollers, Rail, Pulls, Latches. Sliding Door Rail. |
| 19 | A—WROUGHT BUTTS, Narrow, Loose Pin, Light Inside Blind. B—LOOSE PIN BUTTS, Plain, Japanned and Plated Tips. |
| 20 | A—LOOSE JOINT BUTTS, Plain, Japanned and Plated Tips. B—TABLE HINGES, Bronzed Iron Blind Butts. Brass Butts, Narrow, Middle, Broad and Desk. Width when open given of all. |
| 21 | A—DOOR BOLTS, Barrel, Square Spring, Foot, Chain. B—DOOR BOLTS, Flush, Neck and Miscellaneous kinds. |
| 22 | A—SCREW DRIVERS, Flat and Round Blade, Hatchet, Clark's. Screw Driver Bits. Countersinks, Reamers, Belt or Saddlers' Punches. B—RULES. WRENCHES. |
| 23 | A—HOOKS. Coat and Hat, Wardrobe, Schoolhouse, Harness, Clothes line. B—SHELF BRACKETS. DRAWER PULLS. |
| 24 | A—WOOD PLANES, Plane Irons, Cut and Double. B—PATENT PLANES. Patent Plane Irons. |
| 25 | A—WOODENWARE AND BASKETS. Alphabetically arranged. B—WOODENWARE (continued). Alphabetically arranged. |
| 26 | A—PIECED TINWARE. Alphabetically arranged. B—STAMPED TINWARE. Alphabetically arranged. |
| 27 | A—JAPANNED TINWARE. Alphabetically arranged. B—GRANITE OR AGATE IRONWARE. Planished Ware, Stove and Hollow Ware. All Alphabetically arranged. |
| 28 | A—MORTISE DOOR LOCKS, Latches, Knobs and Escutcheons. B—RIM DOOR LOCKS, Latches, &c. |
| 29 | A—PADLOCKS, Japanned, Wrought Iron, Bronzed Iron, Brass and Jail. B—COMPLETE COMPARATIVE LIST OF CORRESPONDING NUMBERS OF PADLOCKS, Mallory, Wheeler Co., Wm. Wilcox Mfg. Co., Russell & Erwin Mfg. Co., Norwich Lock Mfg. Co., Nimick & Brittan Mfg. Co. Revised to July, 1885. |
| 30 | A—CABINET LOCKS, Drawer, Chest, Cupboard and Trunk. Cabinet Keys. B—COMPLETE COMPARATIVE LIST OF CORRESPONDING NUMBERS OF CABINET LOCKS, Eagle, Corbin, Parker, Gaylord, Revised to July, 1885. |
| 31 | A—Length and number of Nails to the pound. Number of feet in a bundle of Hoop, Scroll and Nail Iron. Number of feet of Wire in a pound. Coil or Cable Chain, weight per 100 feet and proof in tons. Bright Coil and Halter Chain and corresponding No. of wire. Sash weights and lines required for common sized windows. B—MISCELLANEOUS TABLES. Showing number Copper Rivets and Burs in a pound. Size of Skates compared with Shoes. Scale Beams, poise or weight needed for each. Brass Kettles, size, weight and capacity. Strap and T Hinges, weight and number packed in a barrel. Comparative Nos. of leading makers of Rules and Levels. Revised to July, 1885. Manila Rope, feet in a pound, weight of coils, breaking strain, &c. |
| 32 | Is adapted for filling in with any line of goods. It is ruled both sides with columns headed respectively "Description," "Size or No.," "List," "Cost," "Job," "Sell." |

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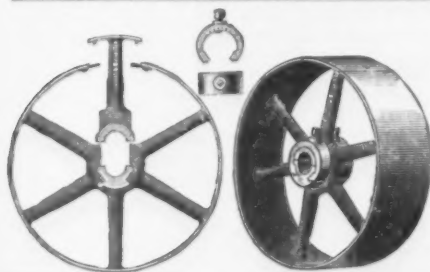
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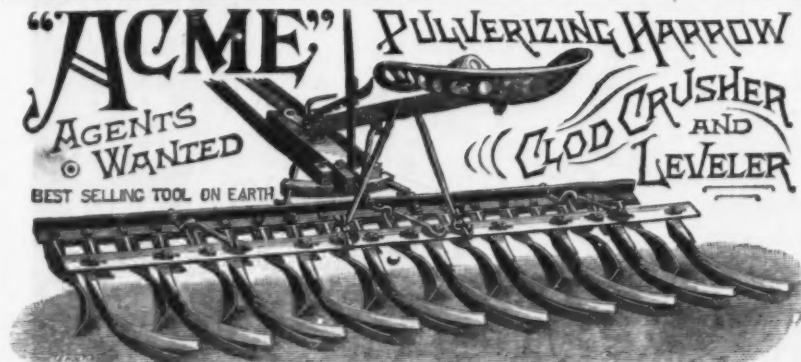
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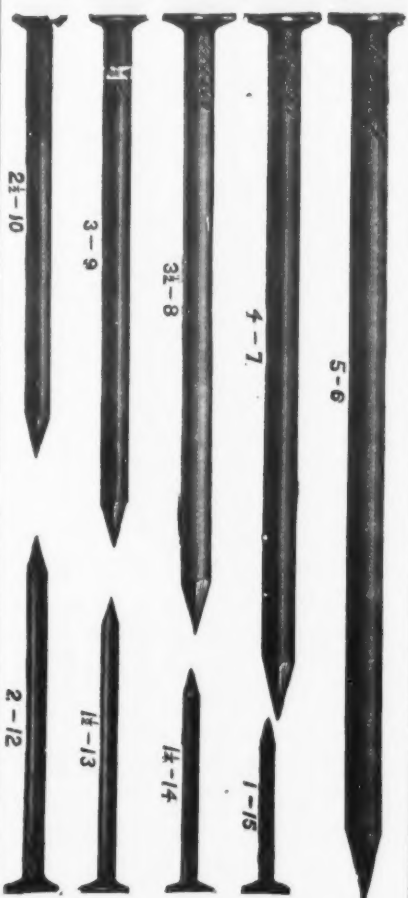
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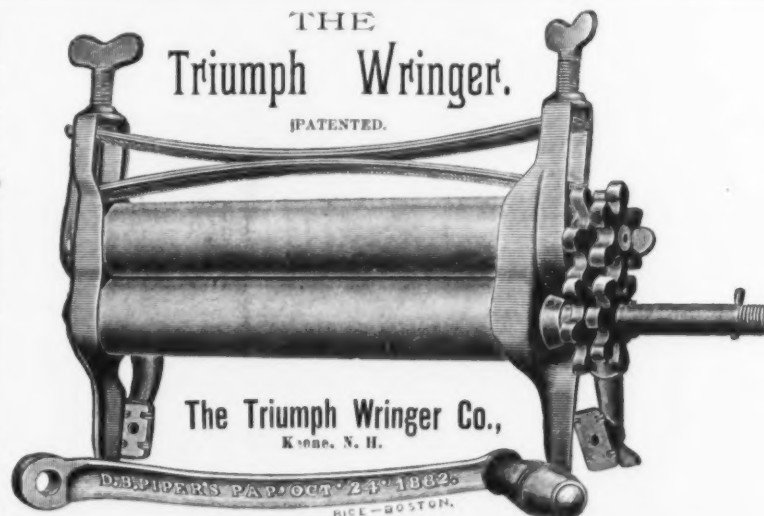
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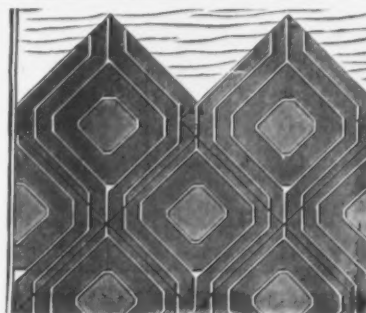
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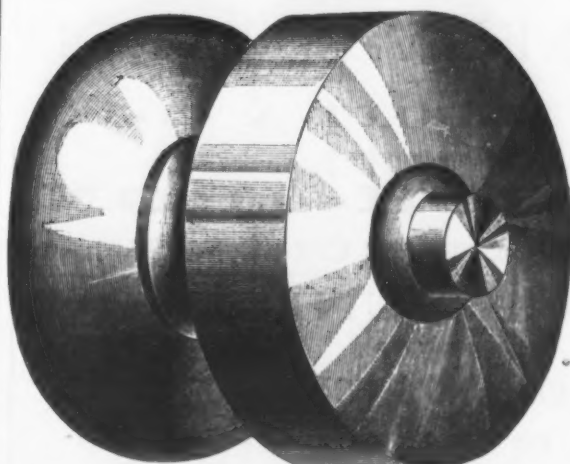
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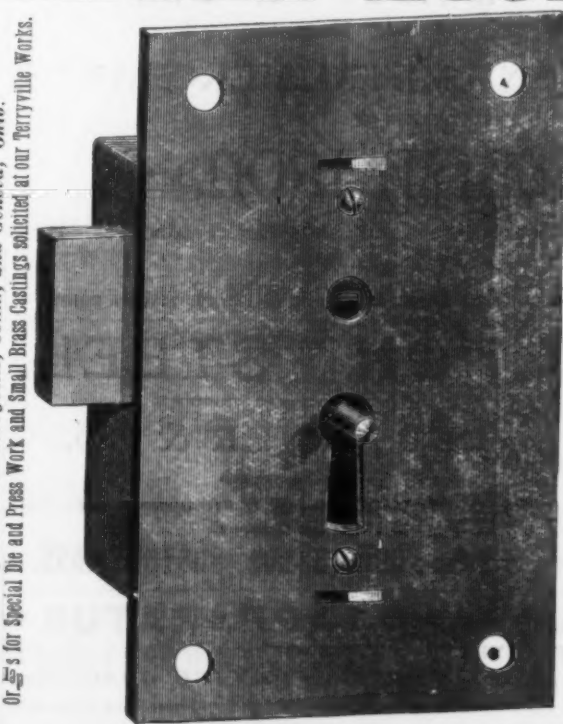
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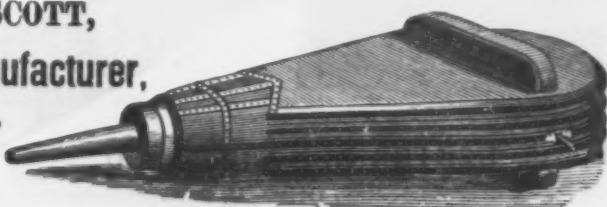
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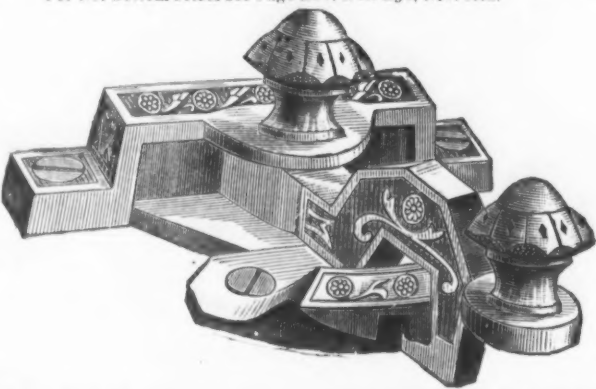
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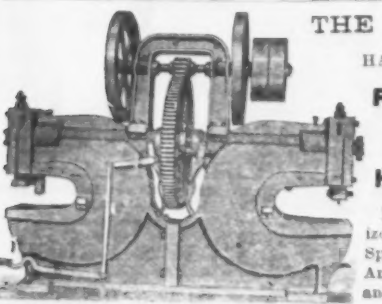
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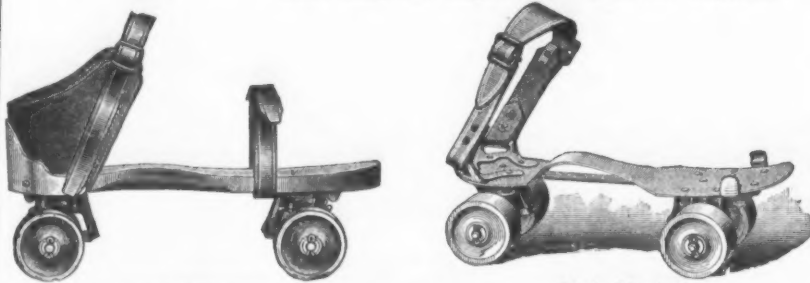
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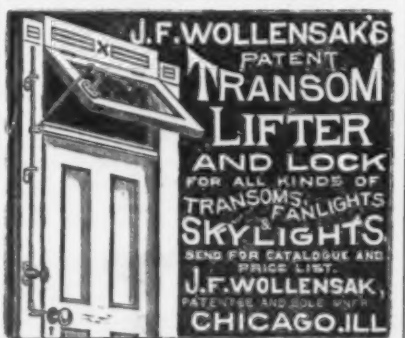
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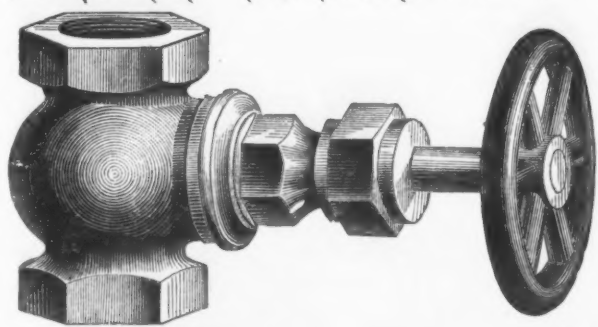
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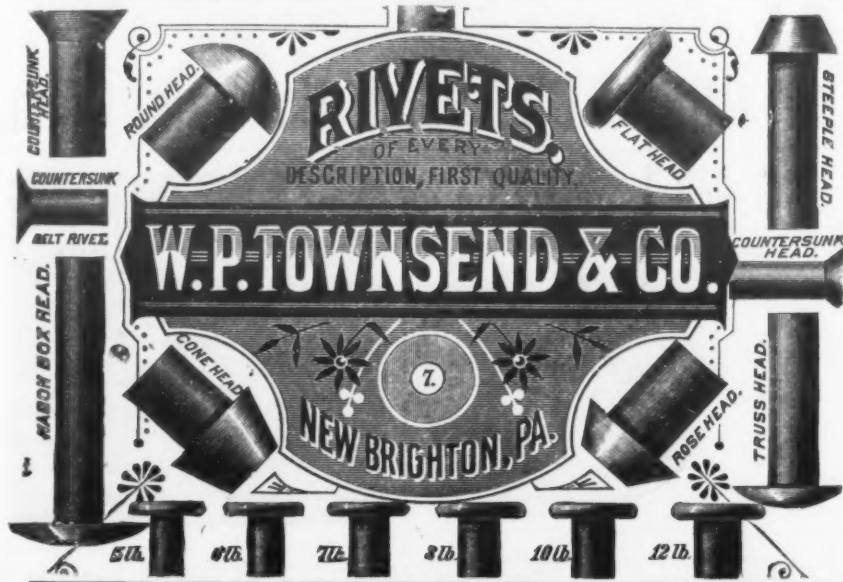


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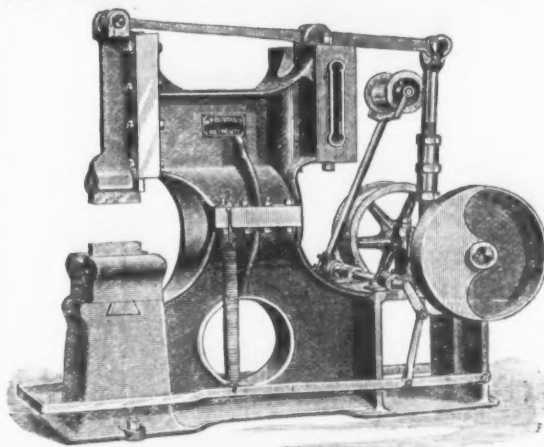
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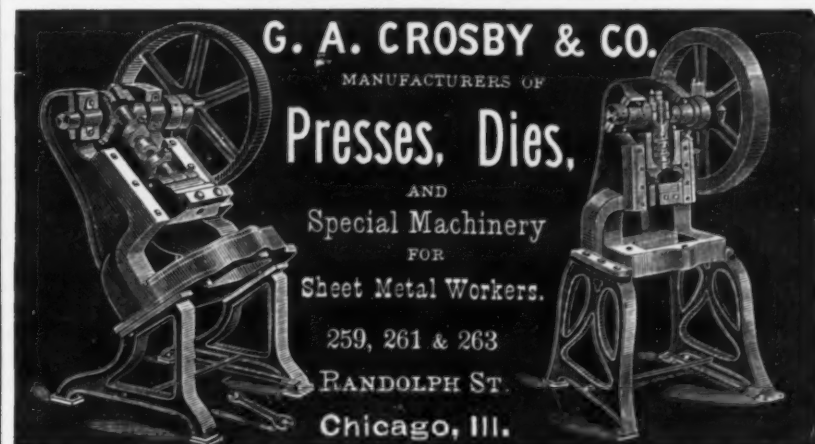
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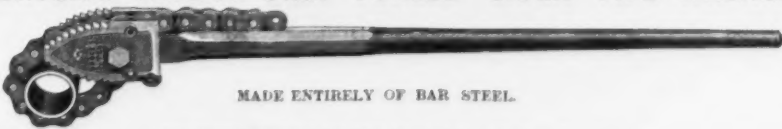
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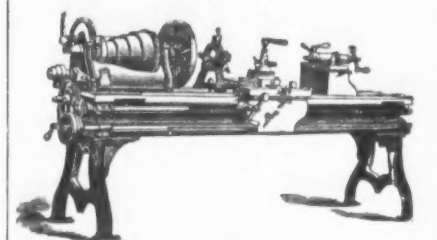
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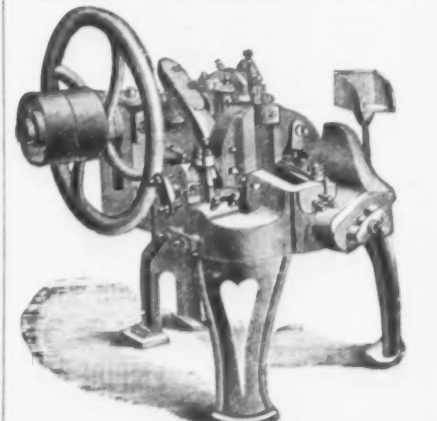
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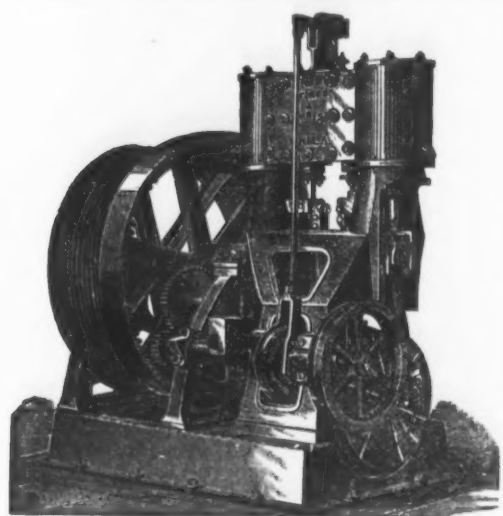
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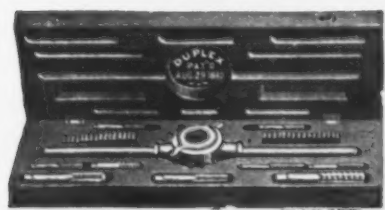
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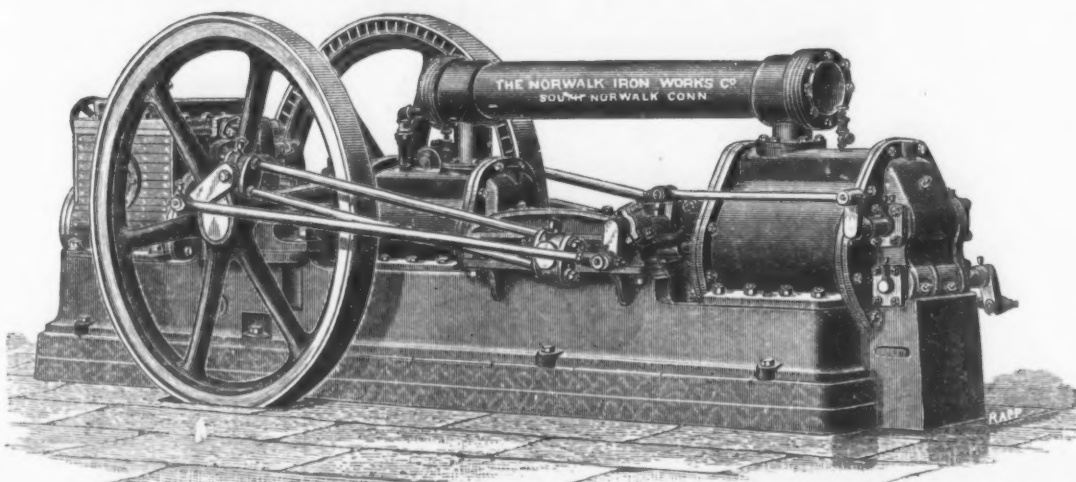
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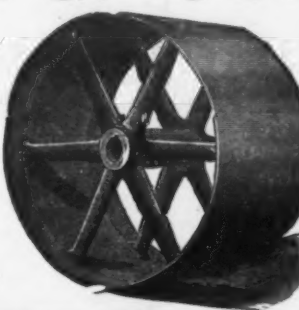
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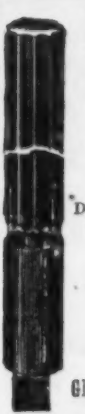
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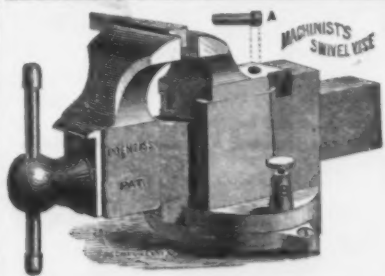
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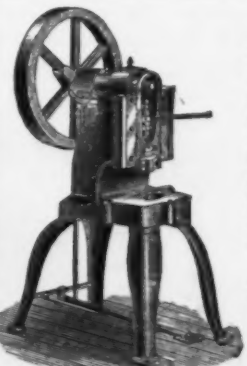
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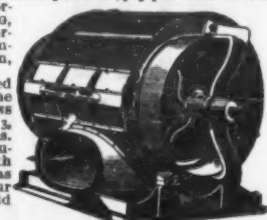
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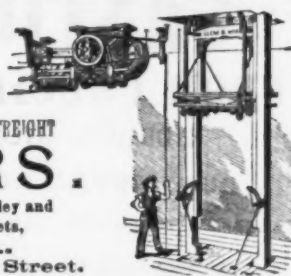


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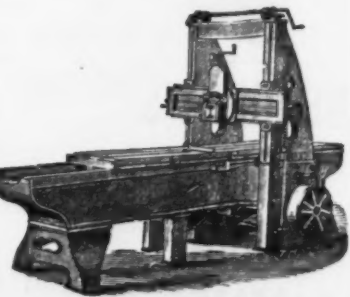
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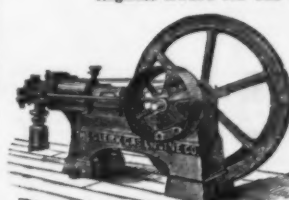
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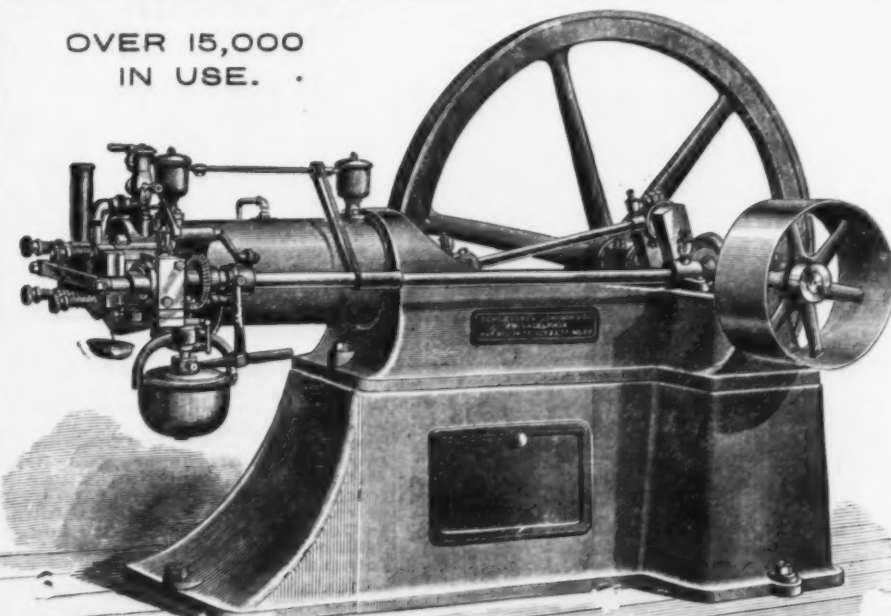
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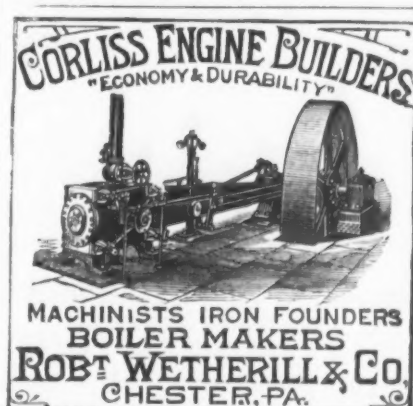
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(From the Engineering and Mining Journal, Aug. 8, 1885.)

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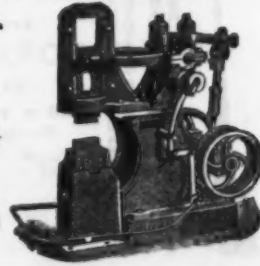
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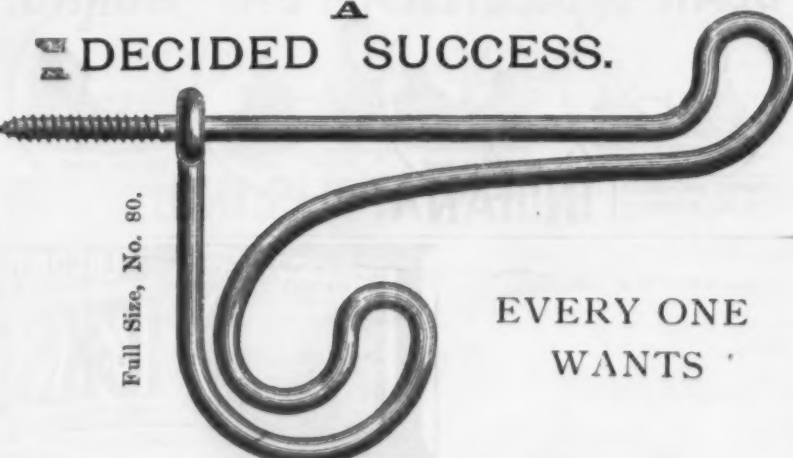
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